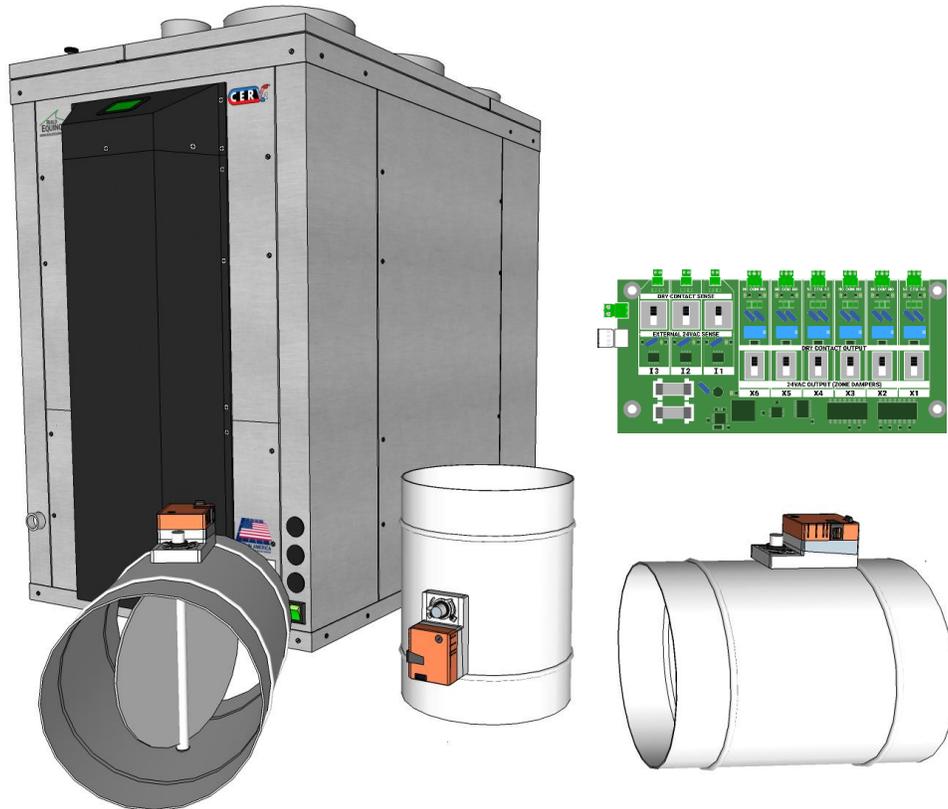




CERV2 Zone Option Manual



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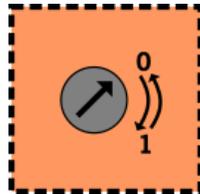
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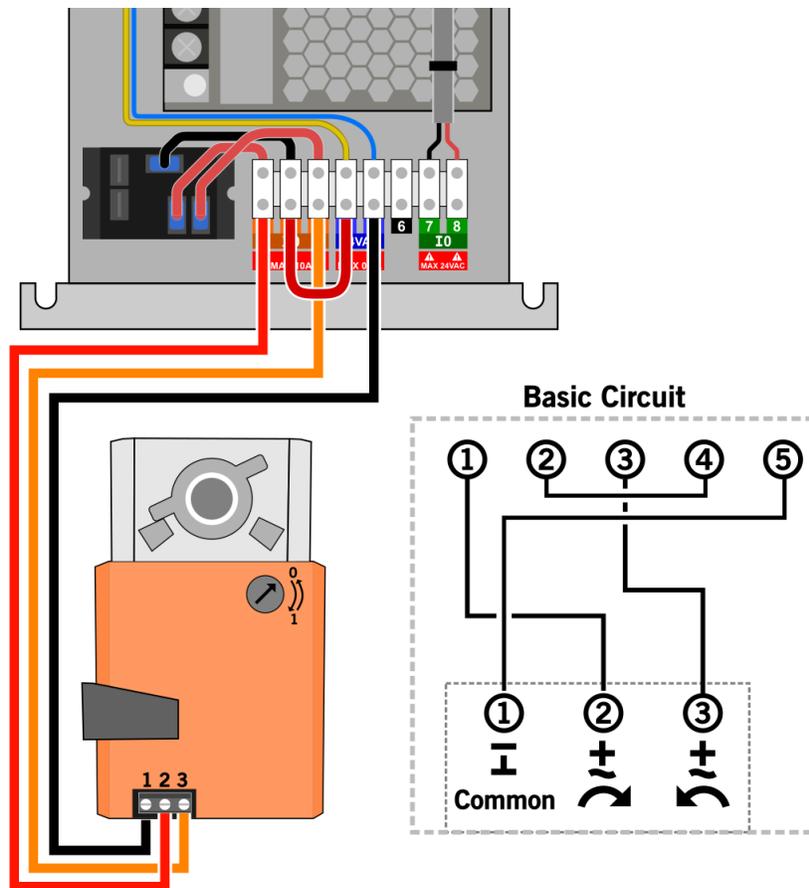
Zone Damper Wiring

There are two ways to physically control the Zone Damper motors – With the CERV’s integrated X0 Auxiliary Output, or with the optional IO Expansion Board. Both options require 3 conductor wire capable of carrying 24VAC at 0.5A (thermostat wire is acceptable).

The standard damper motor terminal block is three positions, with the first as a common, while the second and third activate the damper motor to turn clockwise or counterclockwise when voltage is applied. This may vary if other damper motors, such as spring return, are used. Rotation of the damper motor can sometimes be confusing when wiring the terminals, so the damper motor has an integrated switch to reverse the rotation direction. If you apply system power and find that the damper motor is rotating the wrong way, you can simply toggle the switch with a small flathead screwdriver.

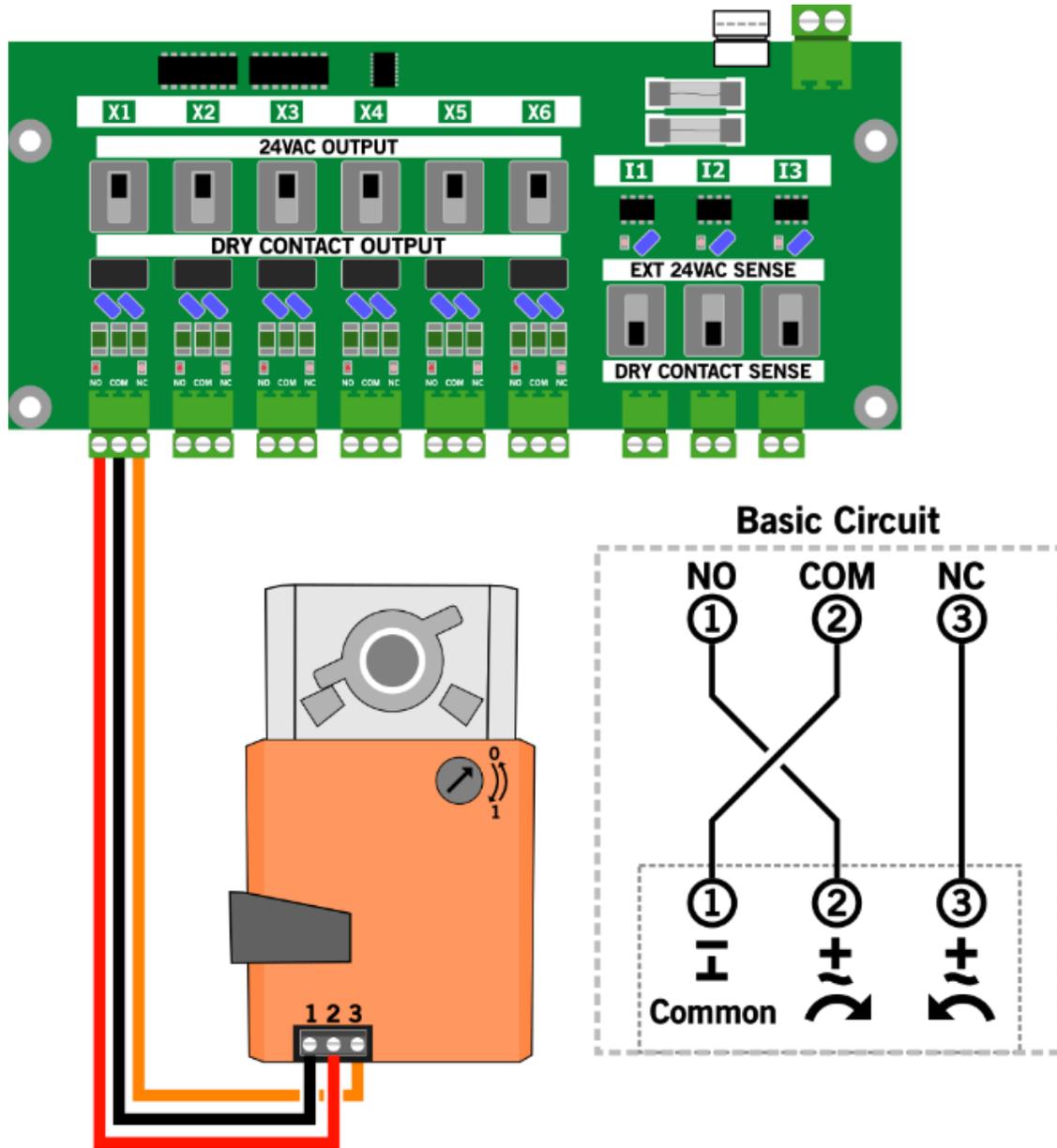


Integrated X0 Auxiliary Output



The terminal block for the X0 Auxiliary Output is located in the bottom section of the CERV2 (**see appendix at end of document for access instructions**). Because the X0 is a standard dry contact with Normally Open (1), Common (2), and Normally Closed (3) terminals, it must be used in conjunction with the 24VAC output terminals (4, 5) as seen above.

IO Expansion Board, X1-X6 Auxiliary Outputs

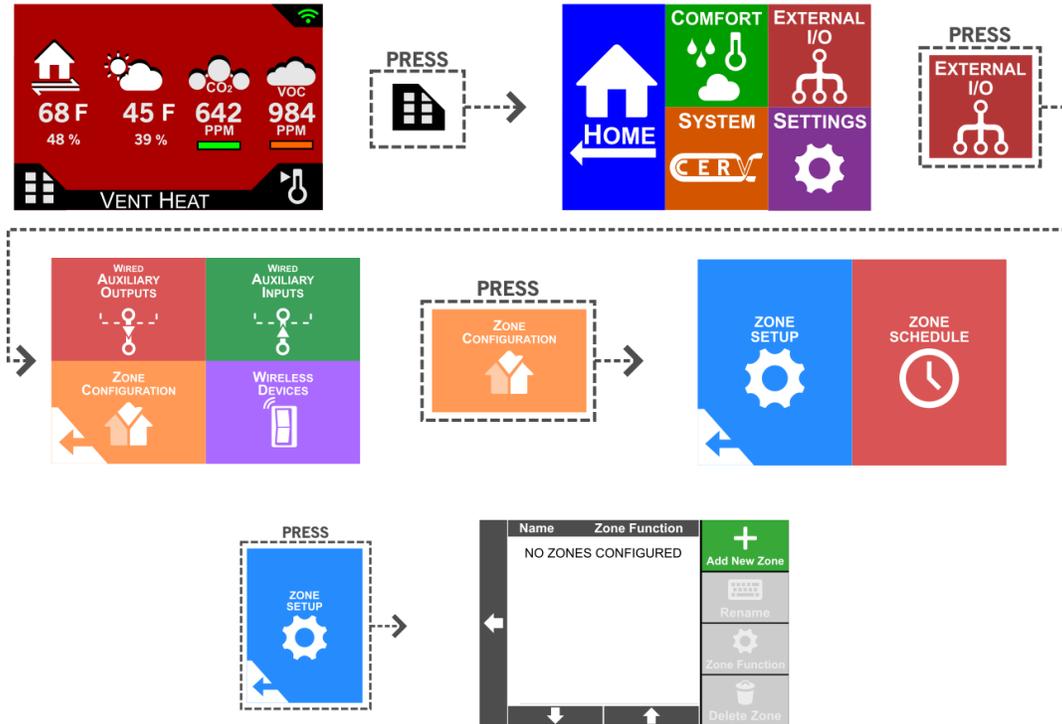


In addition to the integrated X0 Auxiliary output, the I/O Expansion Board is capable of directly outputting 24VAC through its terminals without requiring connection to an external 24VAC source. NOTE: for this configuration, you must move the slide-switch above the terminal block towards the 24VAC OUTPUT label. LED indicators on the I/O Expansion Board will light up above either the NO or NC terminals, to indicate which is active. Up to six zone dampers may be connected to the I/O Expansion Board. See the I/O Expansion Board manual for more information on installing and configuring the expansion board.

Touchscreen Zone Configuration

The first step in setting up your zone damper system is to define Zone areas. The following examples describe how to access the Zone Configuration screen, as well as how to create a new zone, rename a zone, and delete a zone.

Zone Setup



Creating a New Zone

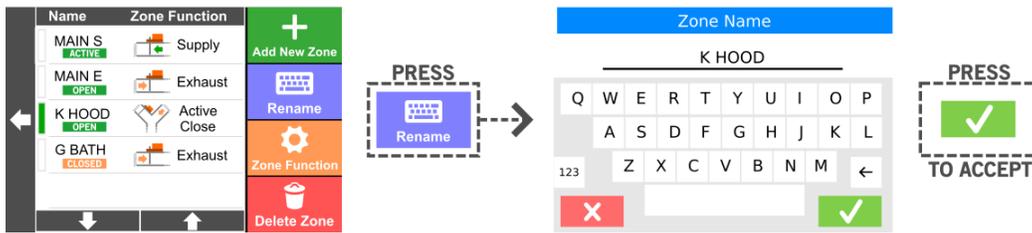


When a new zone is created, the first selection gives you the option of choosing whether the zone is an Exhaust Zone, Supply Zone, or Active Close zone. Descriptions of the zone types are as follows:

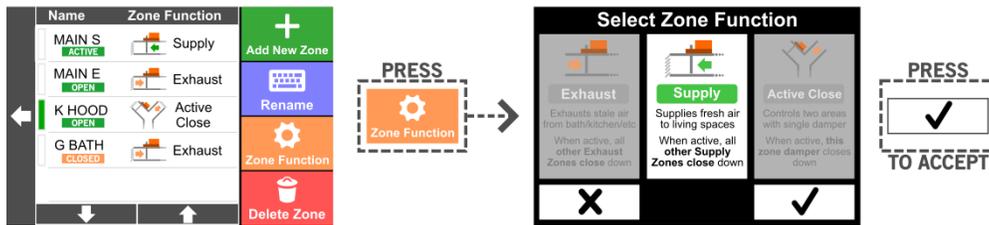
1. **Exhaust Zone:** Exhausts stale air from bathroom, kitchen, or other area with stale air. When this zone is activated (through a paired wireless ventilation switch, auxiliary input, etc.), all other zones configured as Exhaust Zones will close down ensure maximum flow to this zone. Zones configured as Supply or Active Close will not be influenced by activity in Exhaust Zones.
2. **Supply Zone:** Supplies fresh air to living spaces. When this zone is activated (through a paired wireless ventilation switch, auxiliary input, etc.), all other zones configured as Supply Zones will close down ensure maximum flow to this zone. Zones configured as Exhaust or Active Close will not be influenced by activity in Exhaust Zones.
3. **Active Close Zone:** For use when only one zone damper is used to control two spaces. An example of this zone configuration can be seen in the Appendix under Single Damper, Single Zone (Active Close Configuration).

For examples of each zone type, please see the Appendix at the end of this document.

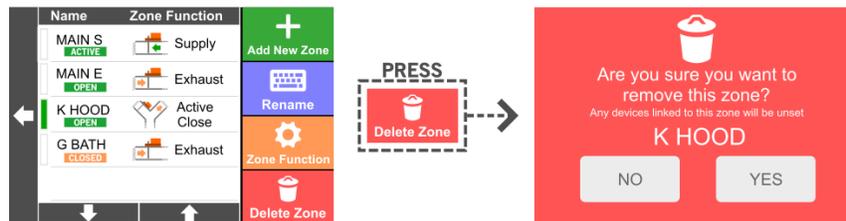
Renaming a Zone



Changing a Zone Type



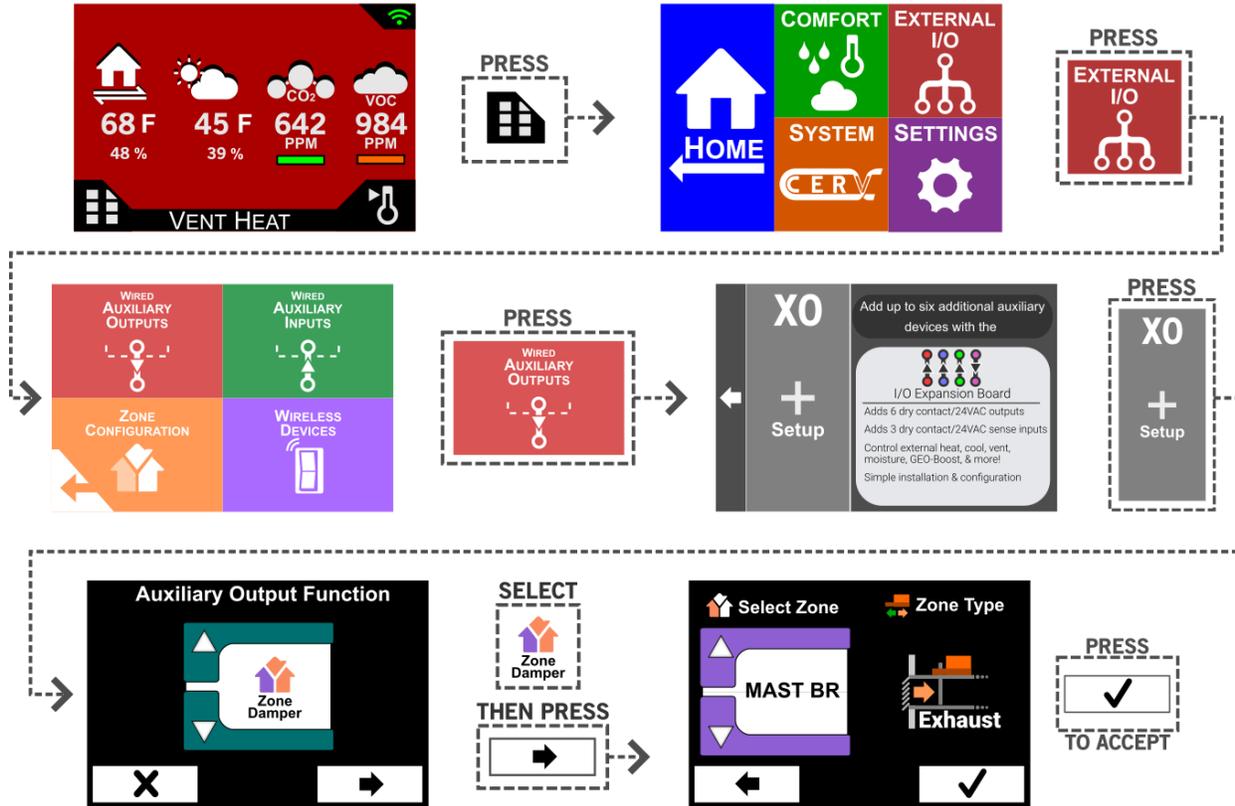
Deleting a Zone



Note: when deleting a zone, any auxiliary inputs or wireless devices linked to this zone will revert to controlling the CERV as a whole (i.e. triggering a ventilation switch would ventilate the whole home instead of the previous zone). Any auxiliary outputs configured as Zone Dampers linked to this zone will be unset.

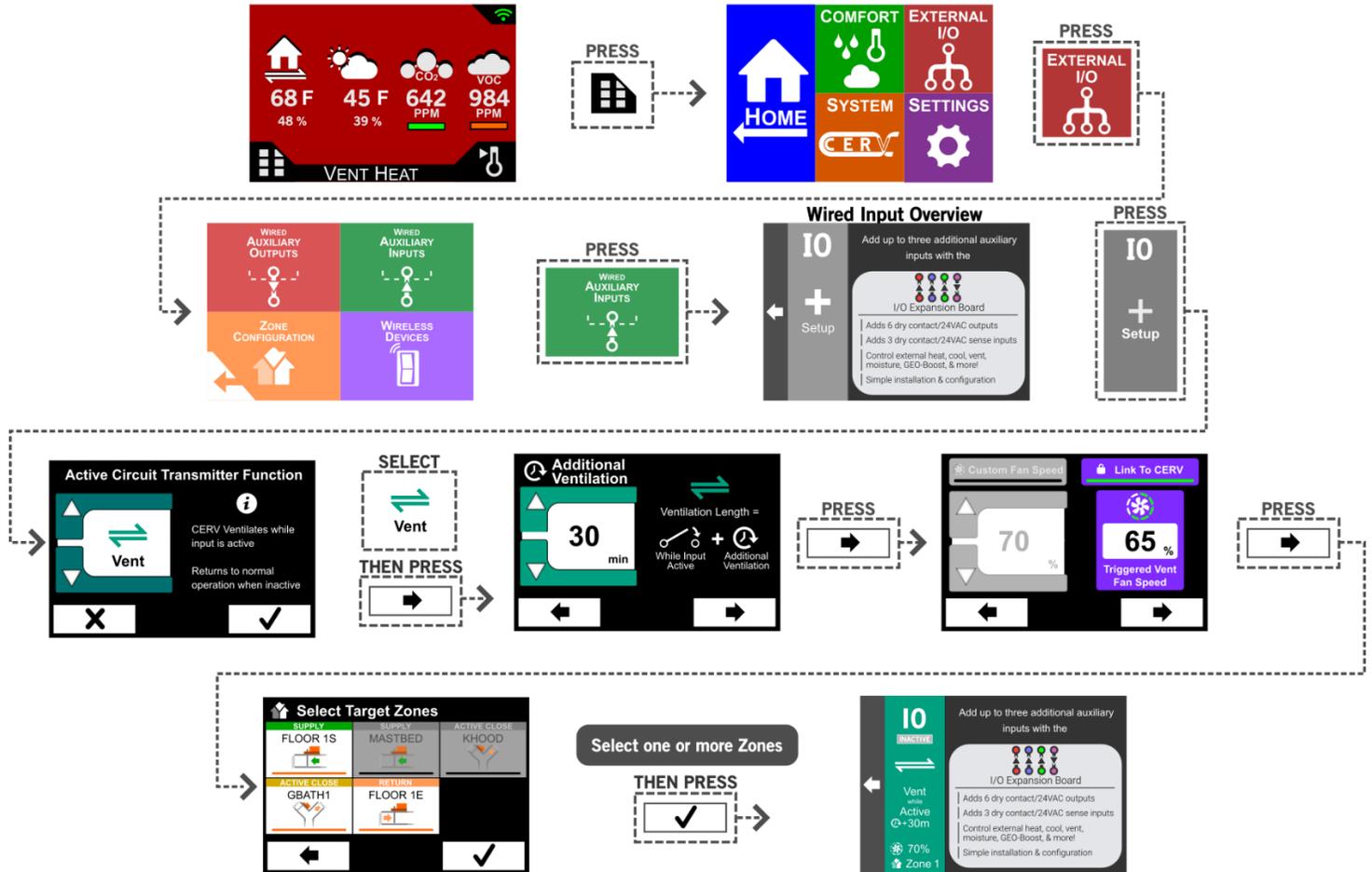
The next step after creating the Zone, is to set up an auxiliary output which will be connected to a zone damper.

Linking a Damper to a Zone

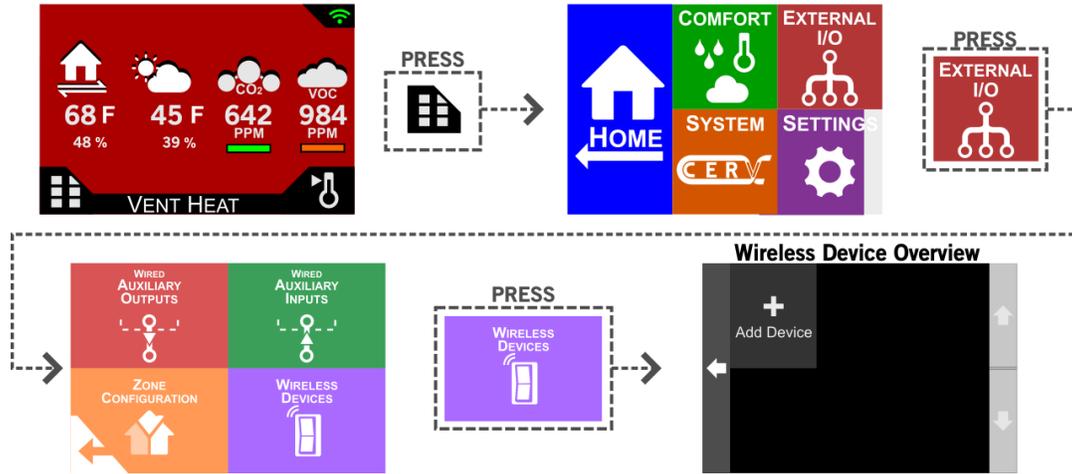


After an auxiliary output has been set to actuate a damper motor, you may configure inputs to trigger one of your configured zones. The steps below walk through setup of wired auxiliary inputs (I0, or I1-I3 on the IO Expansion Board), as well as wireless options such as the wireless ventilation switch or active circuit transmitter. Note: If no zone selection is made, the input will trigger the CERV as a whole to ventilate. Additionally, multiple zones may be linked to the same input if desired

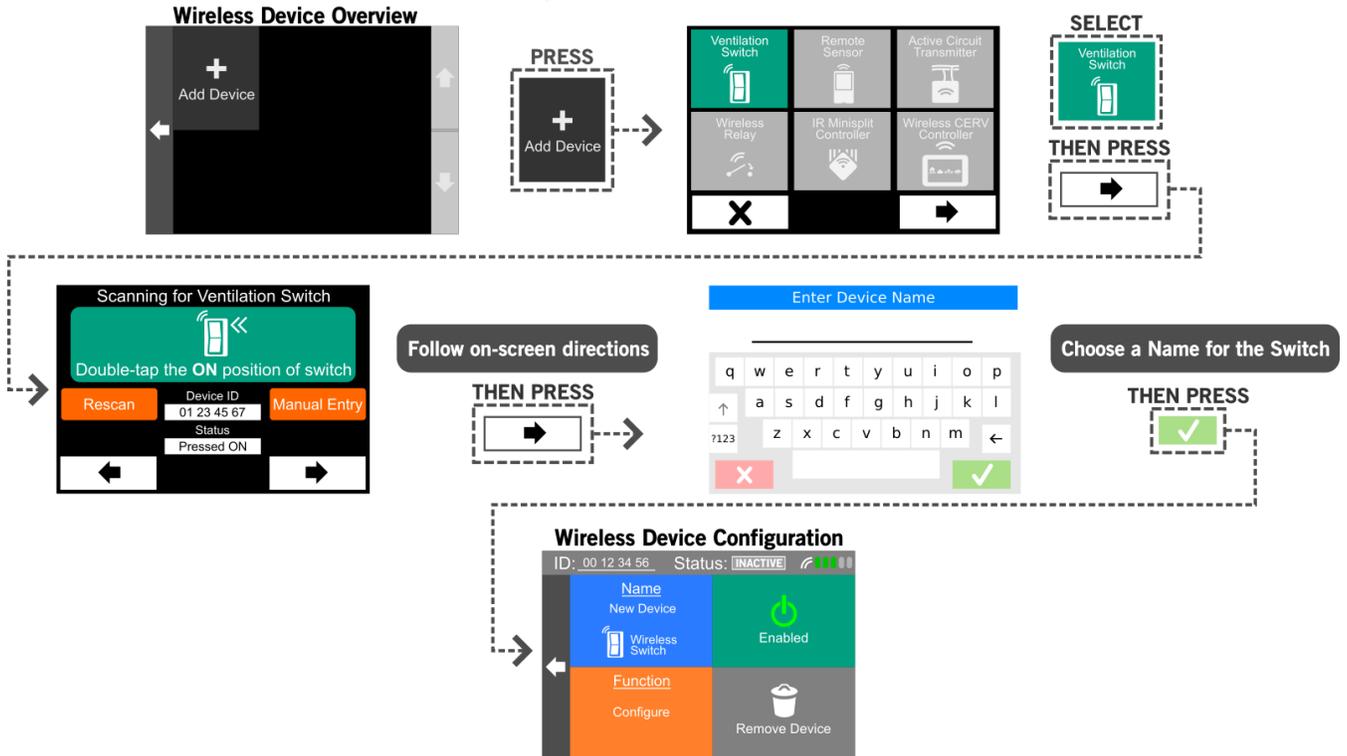
Pairing a Wired Input to Activate a Zone



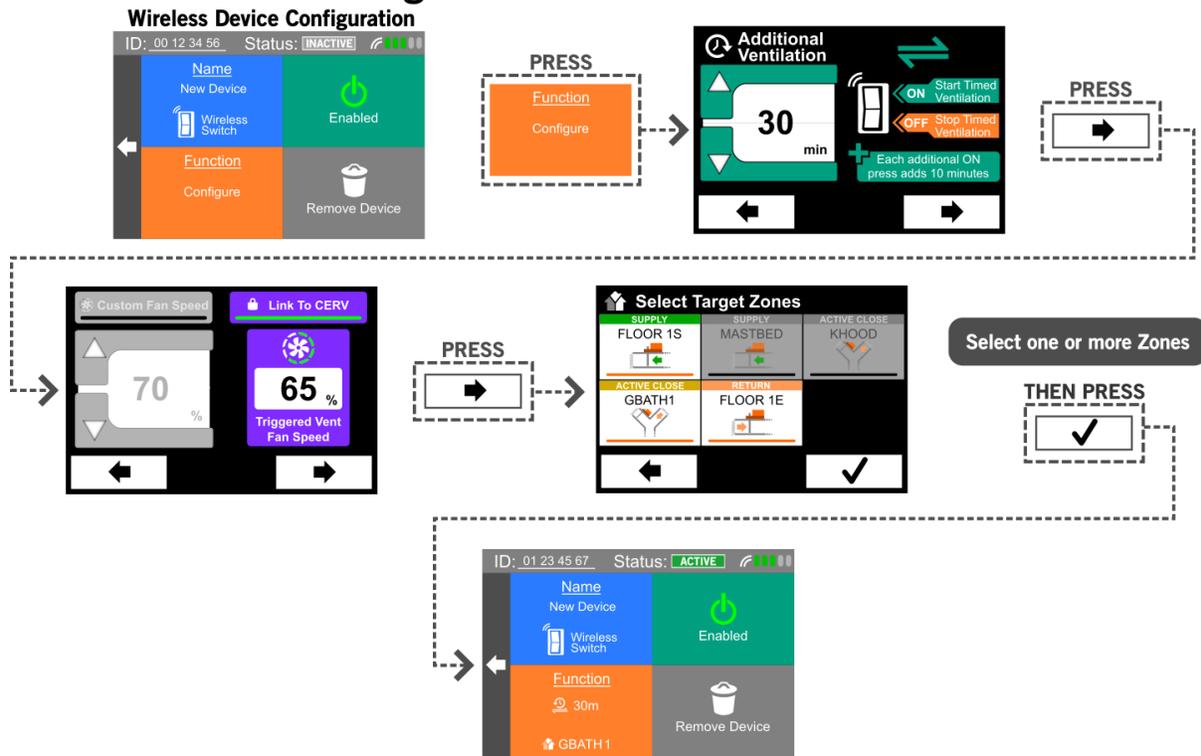
Pairing a Wireless Switch / ACT to Activate a Zone



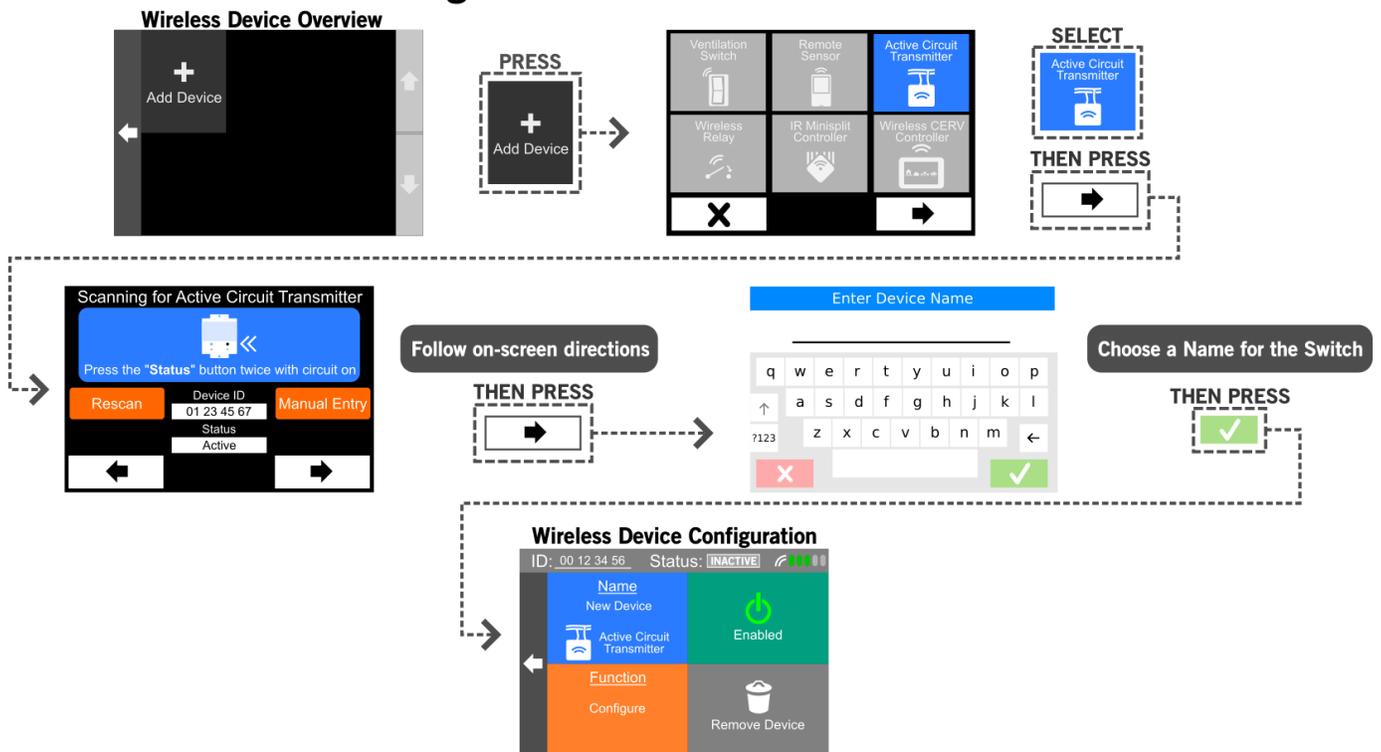
Adding a New Wireless Switch



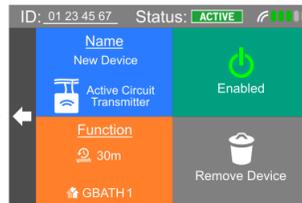
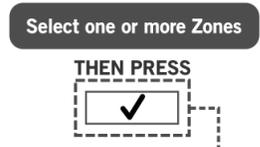
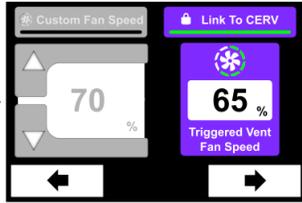
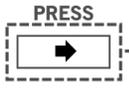
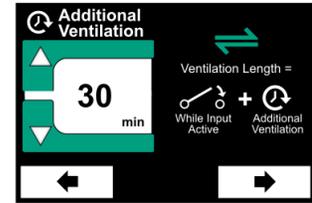
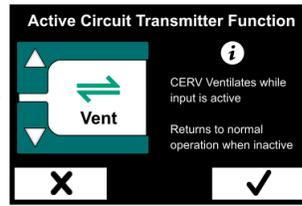
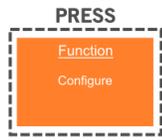
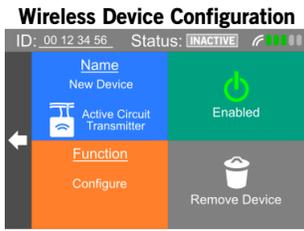
Configure Wireless Ventilation Switch



Adding a New Active Circuit Transmitter



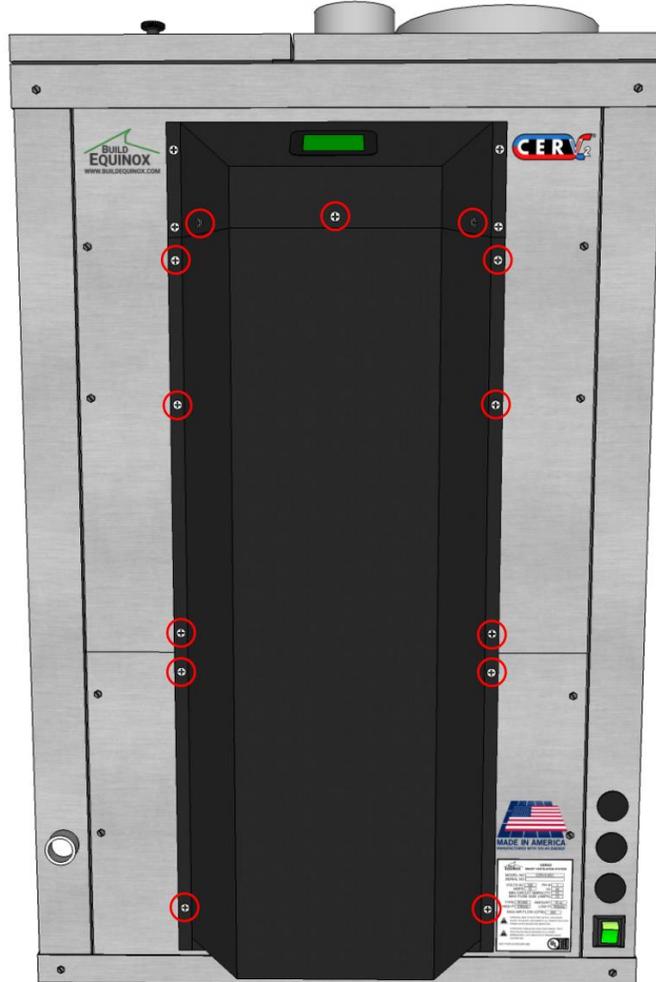
Configure Active Circuit Transmitter



Appendix:

Front Panel Removal and Auxiliary Input/Output (X0 and I0) Access

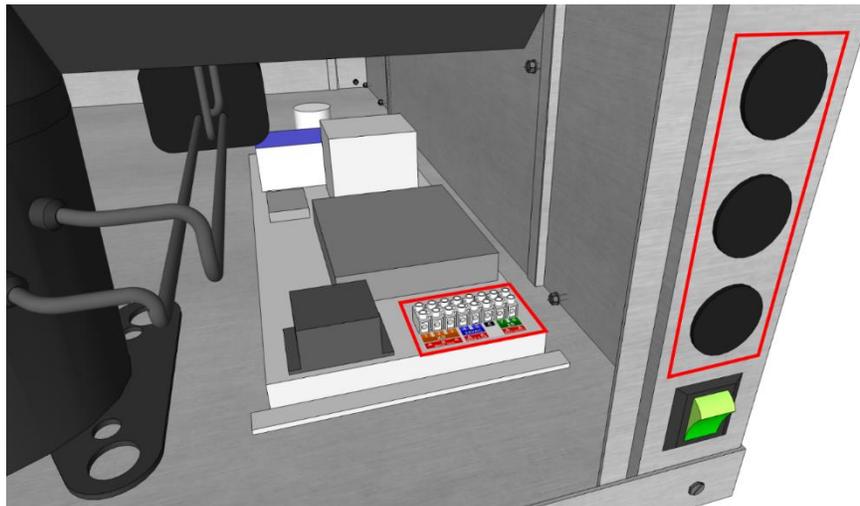
These instructions show how to access the internal input/output connections in the CERV2. Before removing any access covers, power to the CERV2 should be turned off and the unit either unplugged or the electric breaker switched off. Remove the lower front plastic cover by removing the 13 screws shown below.



Once the lower front cover is off, the four screws for the lower access panel can be removed. Screw locations are shown below. With the screws removed, the panel will be free to come out. **Note:** If using the I/O Expansion Board, the module will be accessible on this panel. Wiring should be run through the knockout holes and panel slot for the I/O Expansion Board.

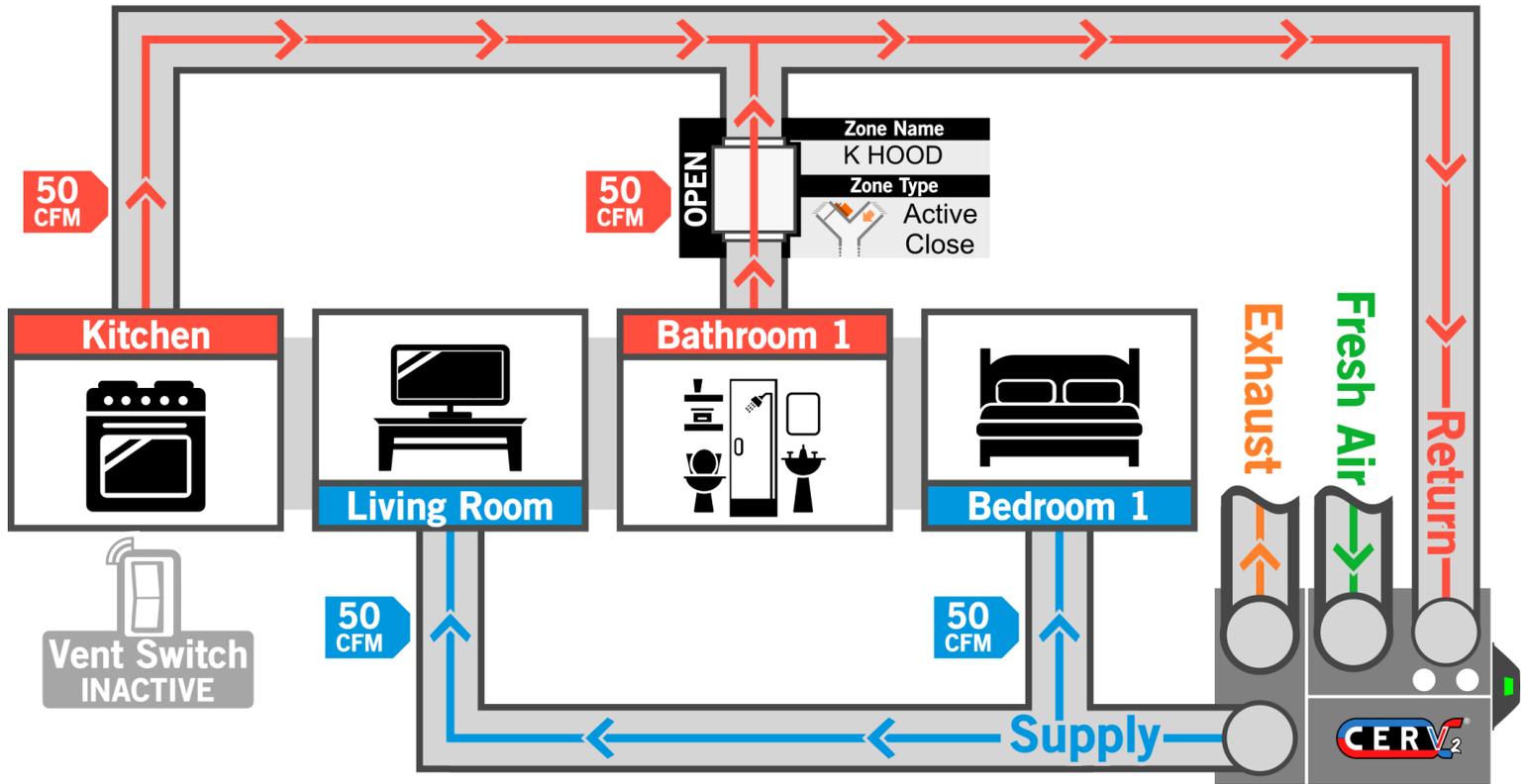


On the right side is the power conditioning and distribution electronics assembly. The I/O terminals are located at the front of this assembly. Three 3/4" knockouts are provided for running wires to the I/O terminals. Conduit or wire strain relief fittings should be used in these knockouts.



Zone Configuration Examples: Single Damper Single Zone

Single Damper, Single Zone (Active Close Configuration) Normal Operation

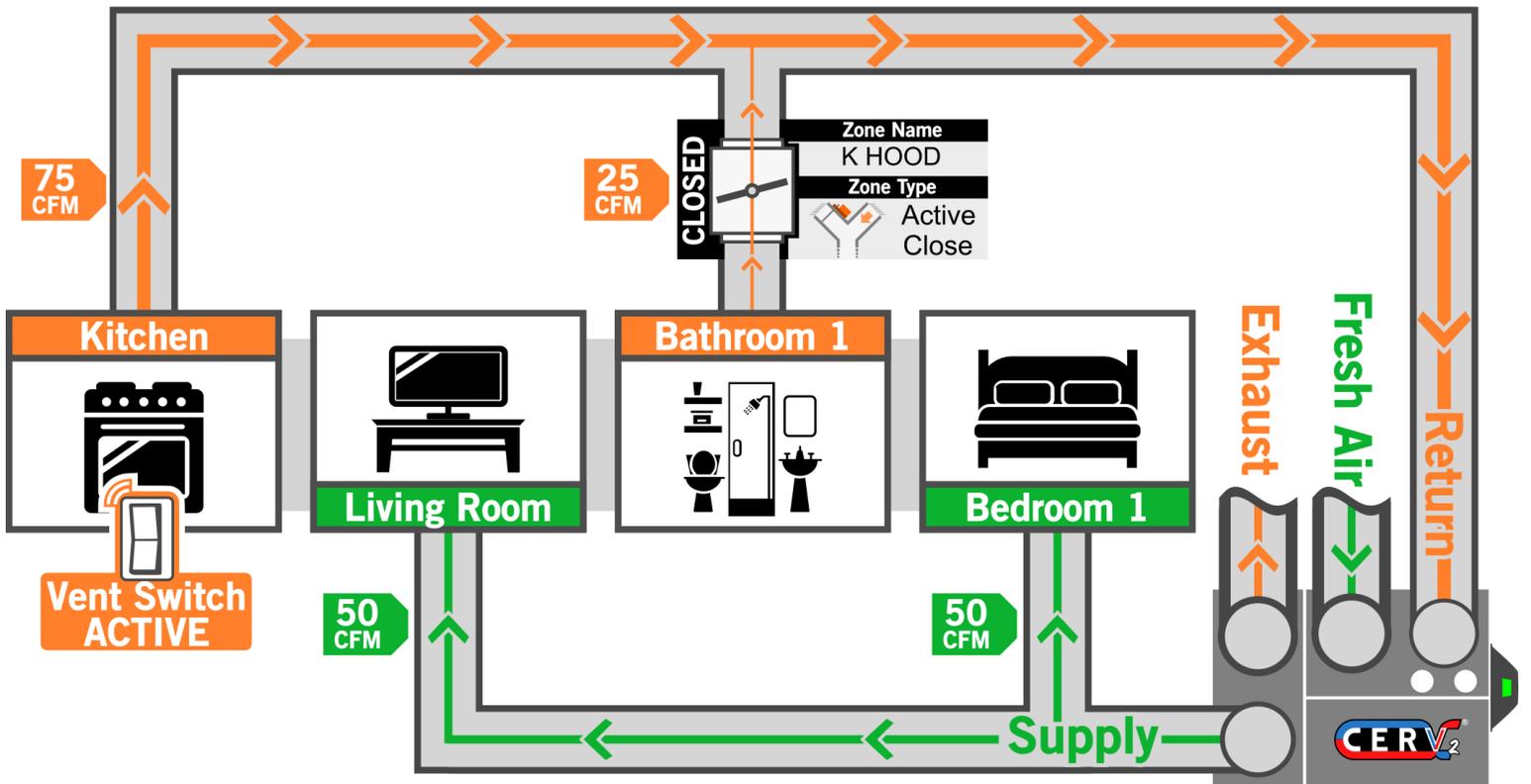


CERV Configuration Screens

Zone Configuration	Wired Auxiliary Outputs	Wireless Devices
<p>Create a zone with Active Close function. When zone is triggered, zone closes.</p>	<p>Set up a wired Auxiliary Output for damper electrical connection.</p>	<p>Pair a wireless switch, set the time length and fan speed (if desired), and associate the switch with the zone.</p>

In the Active Close Zone configuration, a single damper may be used to separate two or more return areas. In this scenario, the active close zone damper is installed in the return line of the bathroom, so that when the zone is “activated” (i.e. paired wireless ventilation switch is pressed) the bathroom return airflow is reduced, and the kitchen airflow is increased. This is a simple example of what may be done to meet localized kitchen ventilation requirements. Additionally, the wireless ventilation switch can be set to increase the ECM fan speed in the CERV for even more effective pollutant removal.

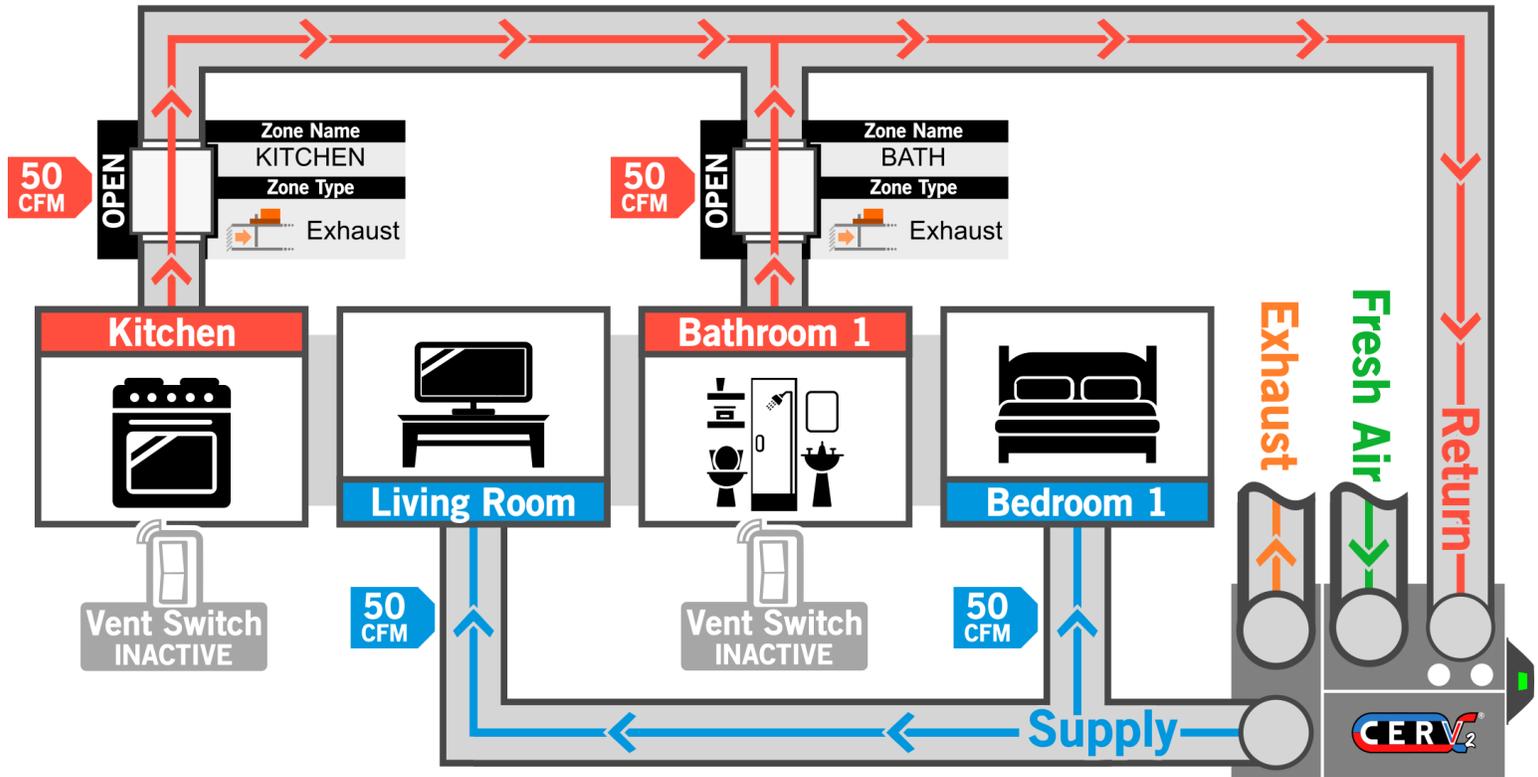
Single Damper, Single Zone (Active Close Configuration) Ventilation Switch Triggered - Zone Damper Active



When the Wireless Ventilation Switch is activated, the Active Close damper in the bathroom return line closes down, reducing the airflow from 50 to 25 CFM, while the kitchen return is now favored, producing 75 CFM.

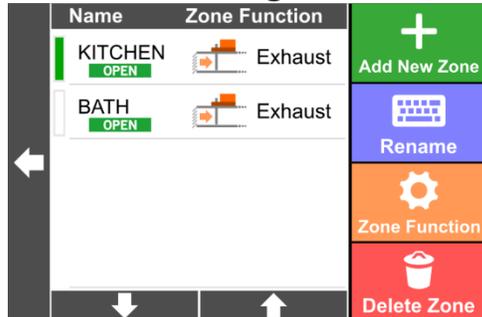
Zone Configuration Examples: Dual Damper, Dual Zone (Exhaust)

Dual Damper, Dual Zone (Exhaust Configuration) Normal Operation



CERV Configuration Screens

Zone Configuration



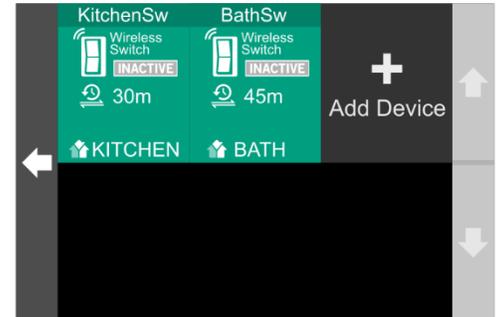
Create two zones with Exhaust functionality. When one zone is triggered, the other zone closes.

Wired Auxiliary Outputs



Set up a wired Auxiliary Output for each damper electrical connection.

Wireless Devices



Pair wireless both switches, set the time length and fan speed (if desired), and associate each switch with the appropriate zone.

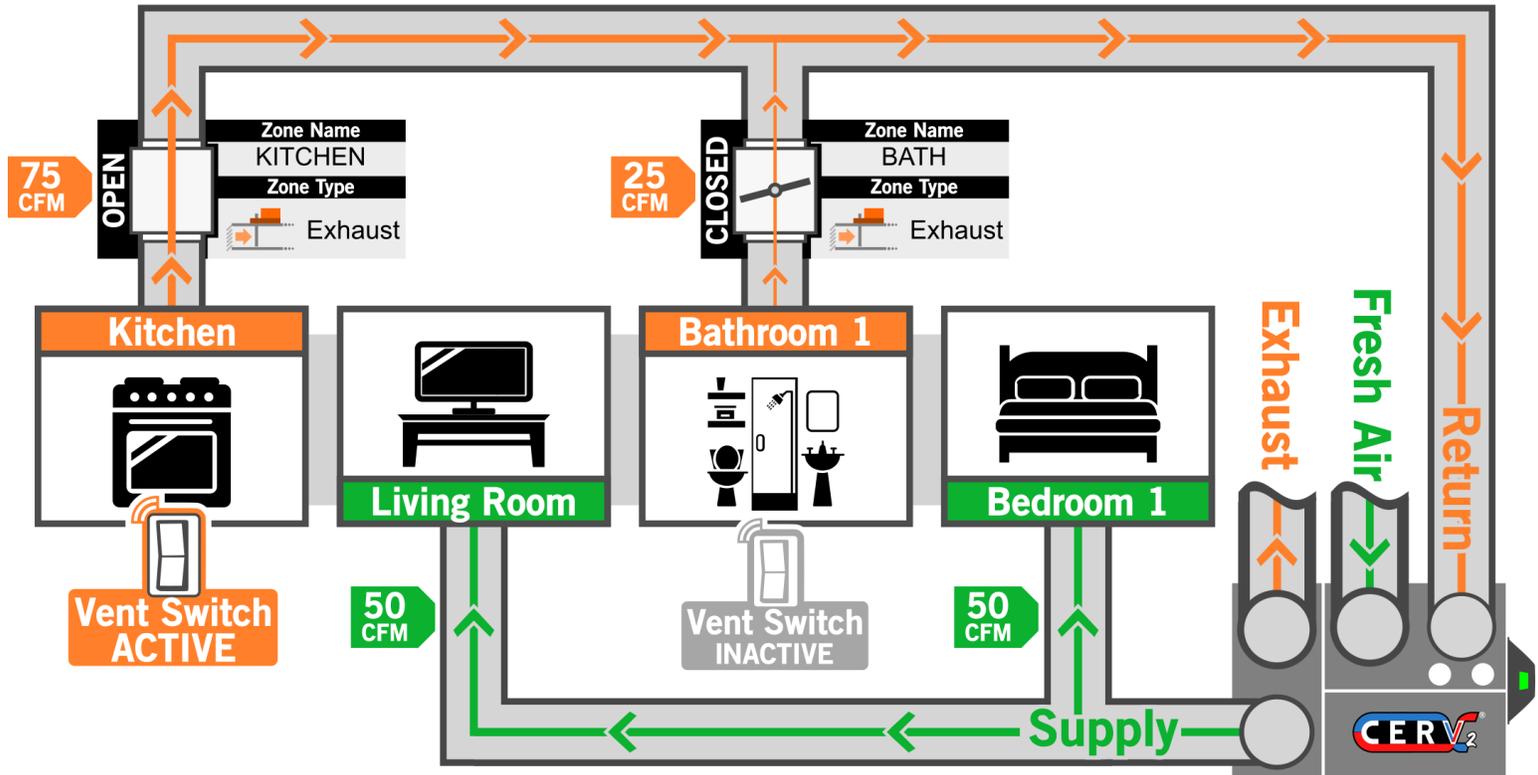
With this Dual Damper, Dual Zone configuration, zone dampers are installed in the return of both the kitchen and bathroom. This allows both areas to be independently favored if their associated wireless ventilation switches are triggered. Triggering the kitchen switch will cause the bathroom zone damper to close down, while triggering the bathroom switch will close the kitchen damper. If both switches are active at the same time, both zone dampers will open.

Example: both switches are hit at the same time. The kitchen switch is configured for 30 minutes of ventilation, while the bathroom switch is configured for 45 minutes. After the switches are both triggered, both kitchen and bathroom zone dampers

remain open. After 30 minutes, the kitchen switch timer expires, leaving only the bathroom ventilation switch active. For the next 15 minutes, the kitchen damper will be closed and bathroom damper will be open. After the last timer expires, both dampers fully open.

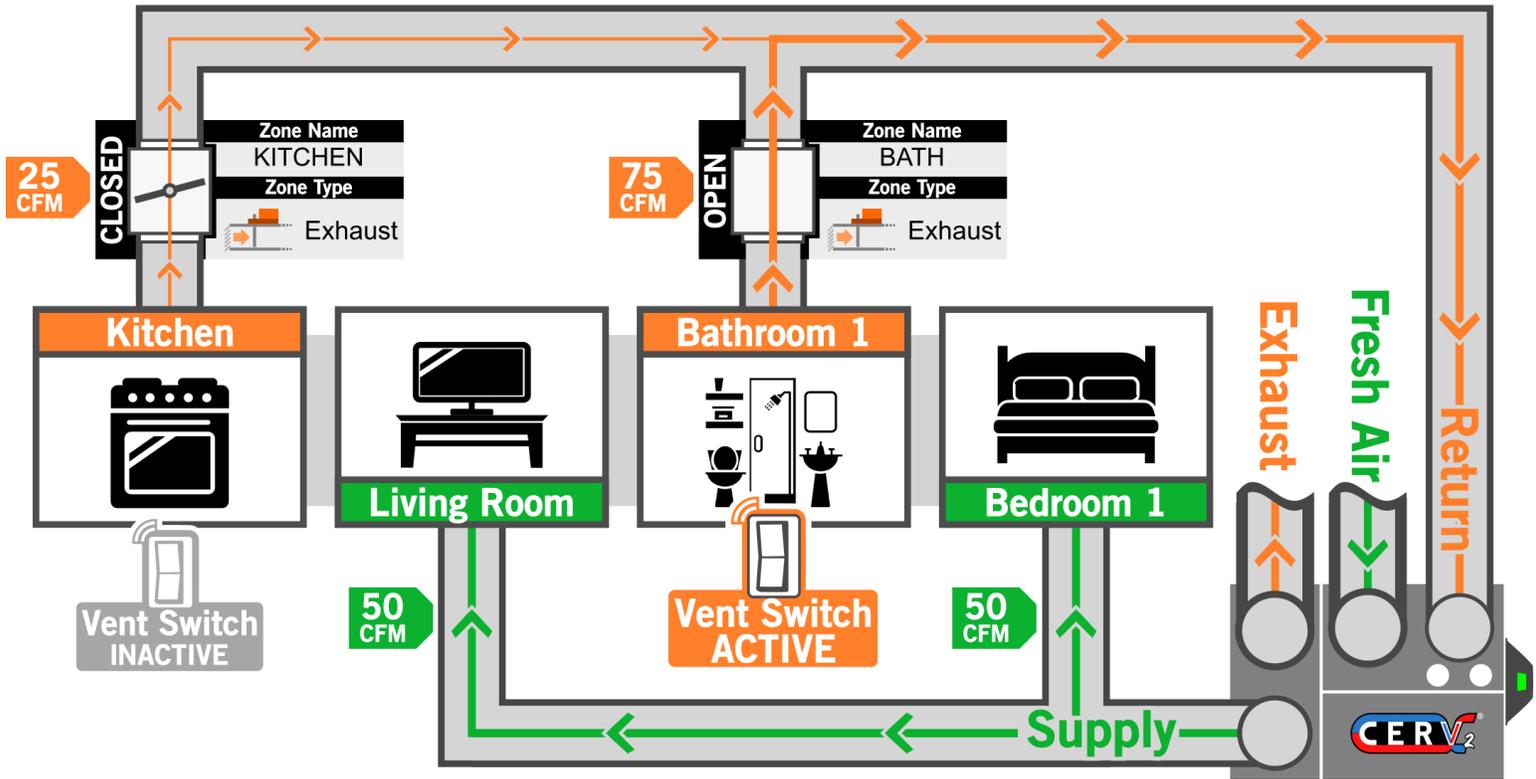
Dual Damper, Dual Zone (Exhaust Configuration)

Kitchen Vent Switch Triggered



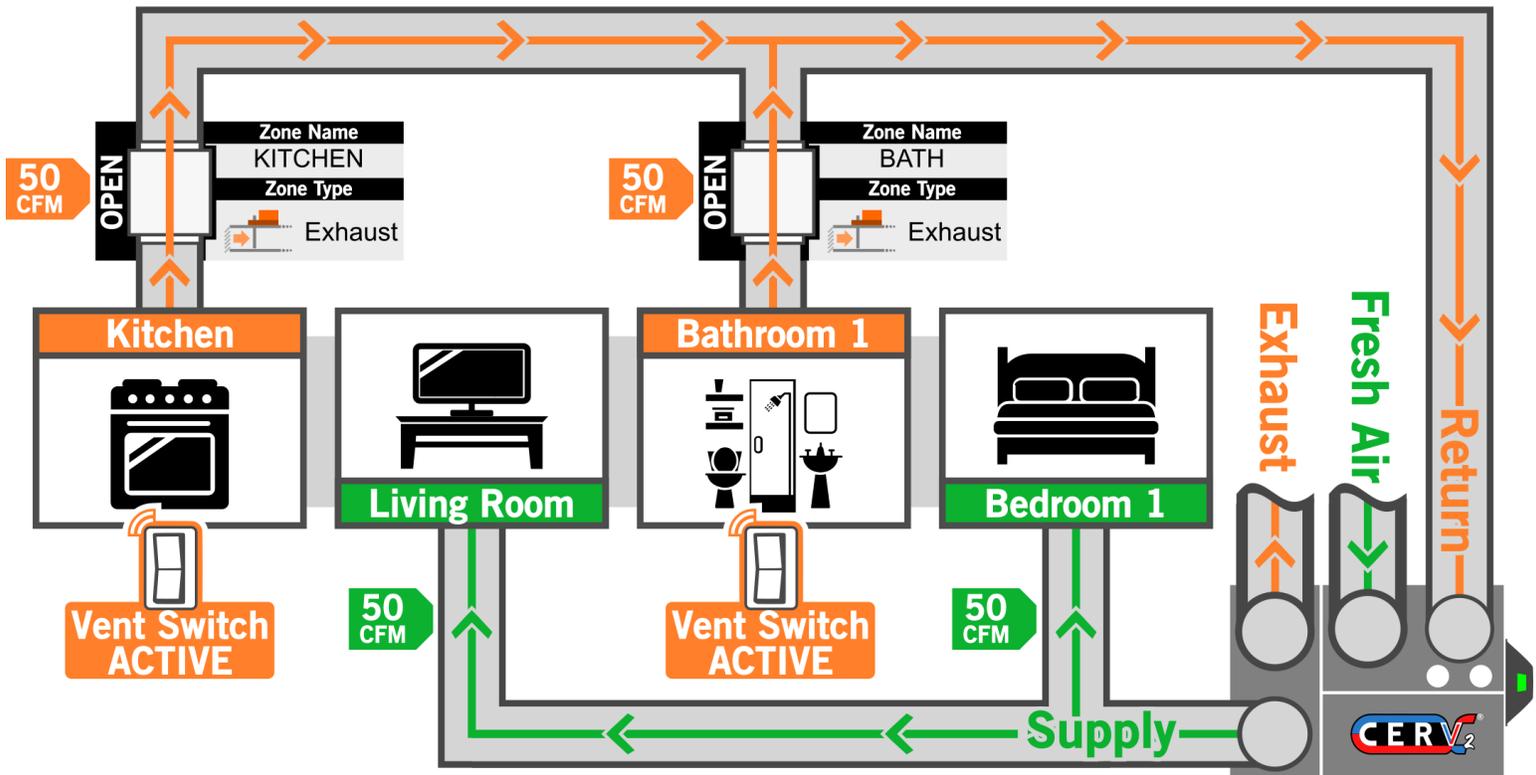
Dual Damper, Dual Zone (Exhaust Configuration)

Bathroom Vent Switch Triggered



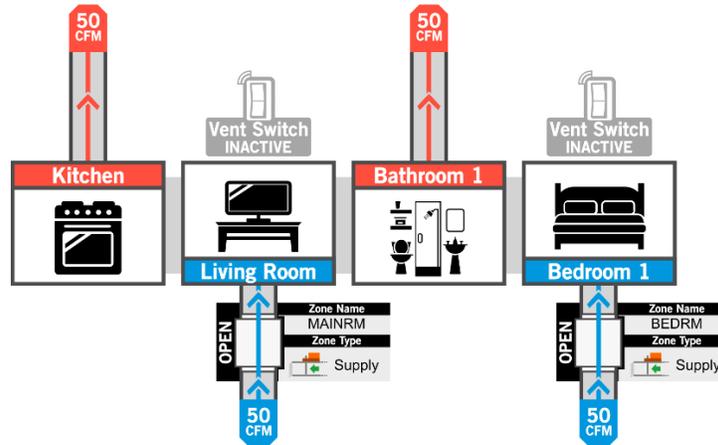
Dual Damper, Dual Zone (Exhaust Configuration)

Kitchen and Bathroom Vent Switches Triggered

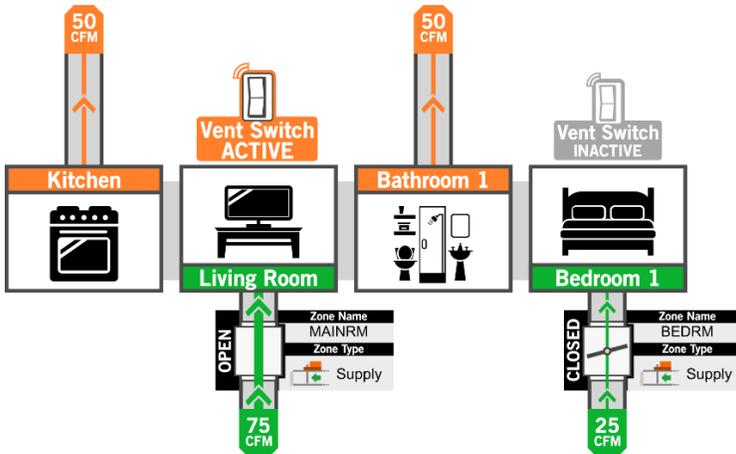


Zone Configuration Examples: Dual Damper Dual Zone (Supply)

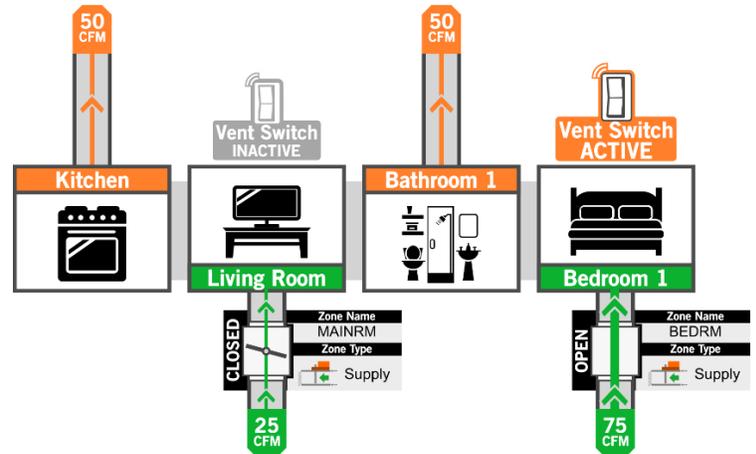
Dual Damper, Dual Zone (Supply Configuration) Normal Operation



Dual Damper, Dual Zone (Supply Configuration) Living Room Vent Switch Triggered

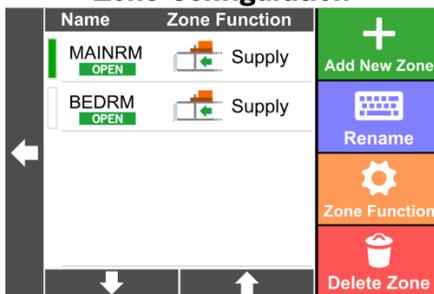


Dual Damper, Dual Zone (Supply Configuration) Bedroom Vent Switch Triggered



CERV Configuration Screens

Zone Configuration



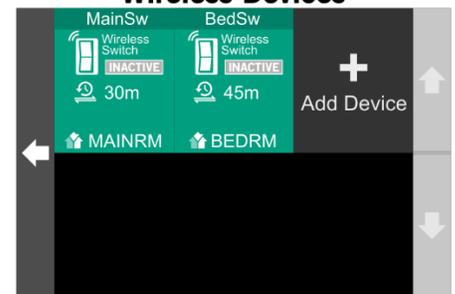
Create two zones with Exhaust functionality. When one zone is triggered, the other zone closes.

Wired Auxiliary Outputs



Set up a wired Auxiliary Output for each damper electrical connection.

Wireless Devices

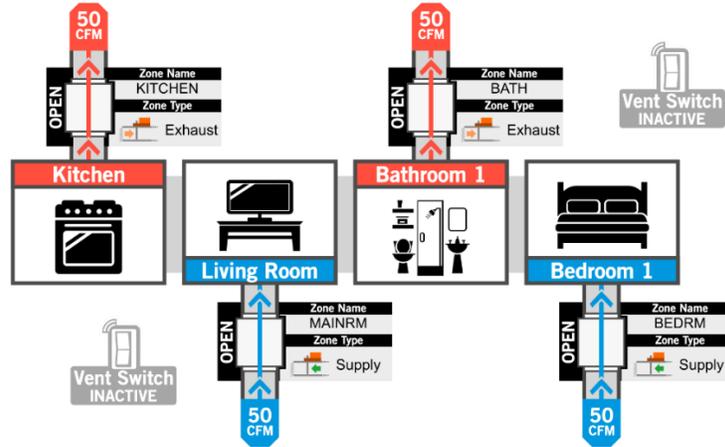


Pair wireless both switches, set the time length and fan speed (if desired), and associate each switch with the appropriate zone.

This configuration is similar to the previous Dual Damper, Dual Zone (Exhaust Configuration), but with the dampers on the supply side. This configuration could be used when you want to direct more fresh air into specific living spaces.

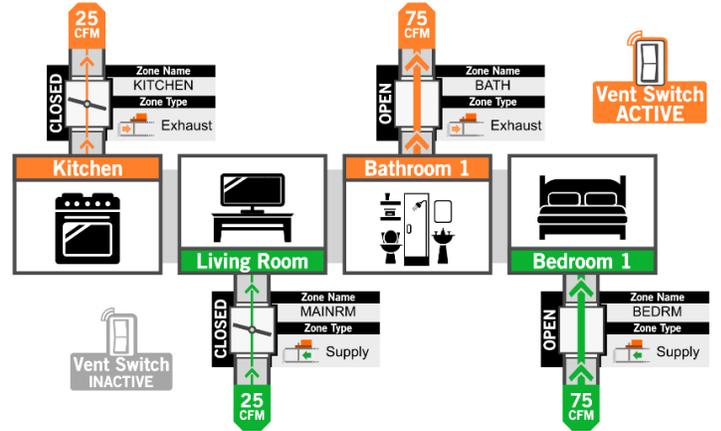
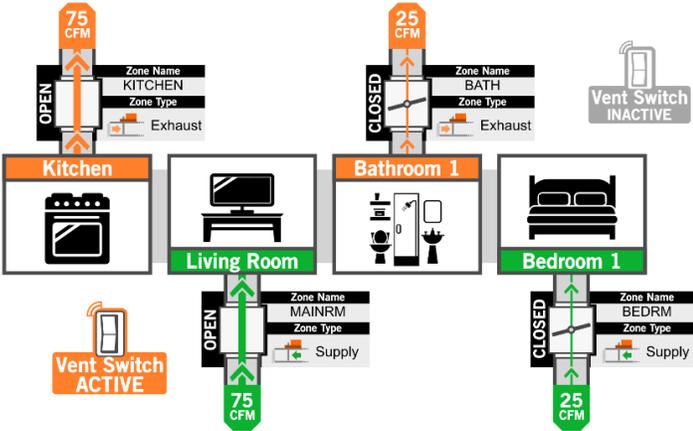
Zone Configuration Examples: Multi Damper Multi Zone (Supply & Exhaust)

Multi Damper, Multi Zone (Supply & Exhaust Configuration) Normal Operation

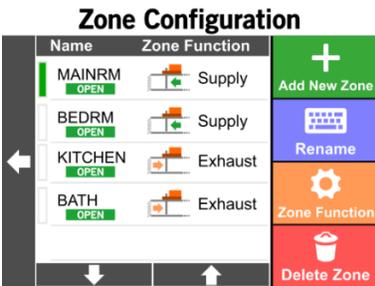


Multi Damper, Multi Zone (Supply & Exhaust Configuration) Kitchen/Living Room switch triggered

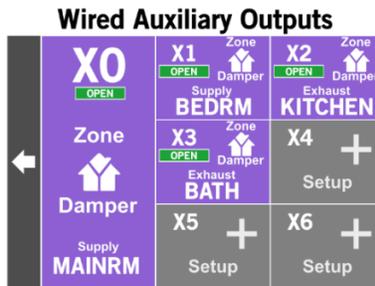
Multi Damper, Multi Zone (Supply & Exhaust Configuration) Bedroom/Bathroom switch triggered



CERV Configuration Screens



Create two zones with Exhaust functionality, and two with Supply.



Set up a wired Auxiliary Output for each damper electrical connection.

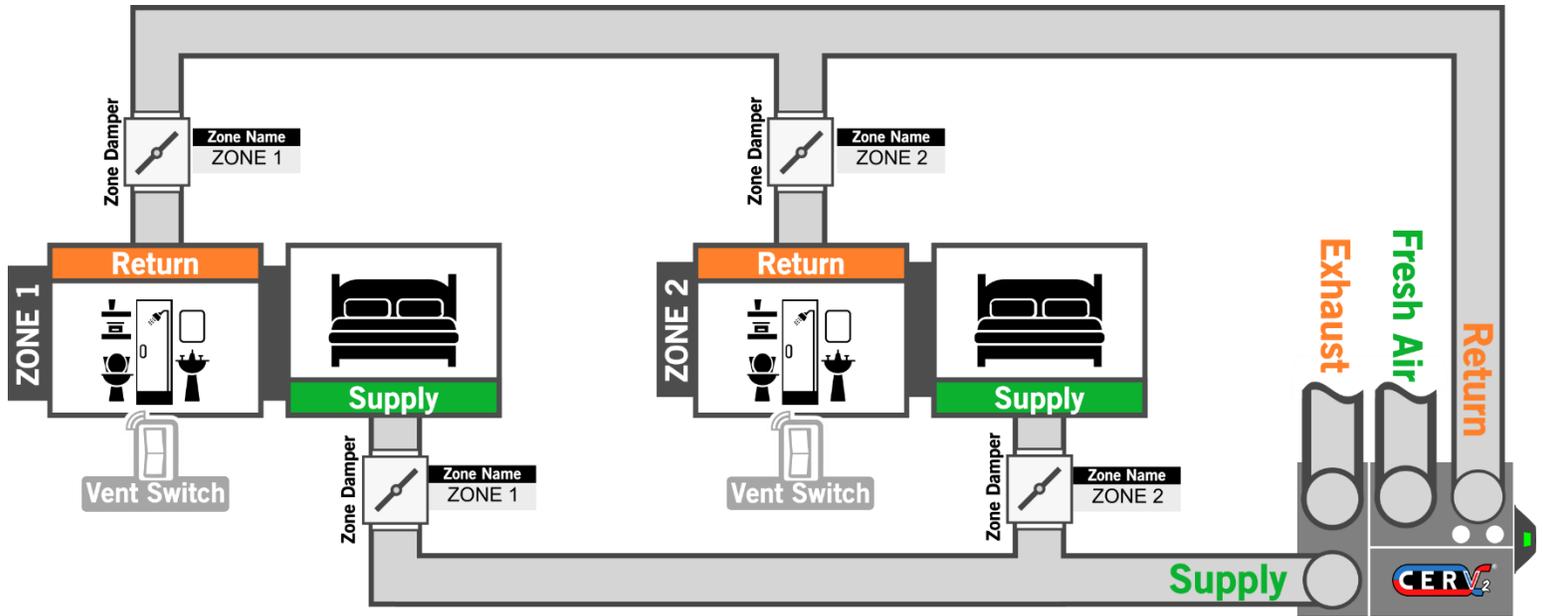


Pair wireless both switches, set the time length and fan speed (if desired). The first switch activates both Kitchen and Living room Zones, while the second activates the bedroom and bath.

In this unique configuration, the home has zone dampers installed in both supply and return ducts. Two wireless switches are used, each one controlling multiple zones. When the first ventilation switch is triggered, it signals the CERV to close down the bedroom and bathroom, while favoring the living room and kitchen. This directs the most fresh air into the living room space, while removing the most air from the kitchen (an ideal operation, say, if you were hosting a large party). The other ventilation switch triggers the CERV to instead favor the bedroom and bathroom supply and returns.

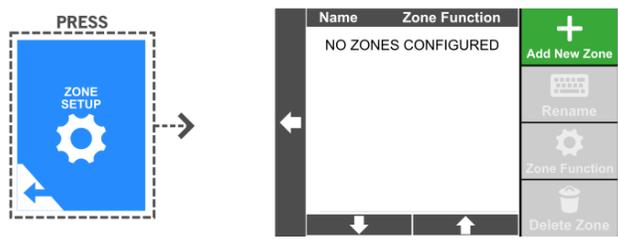
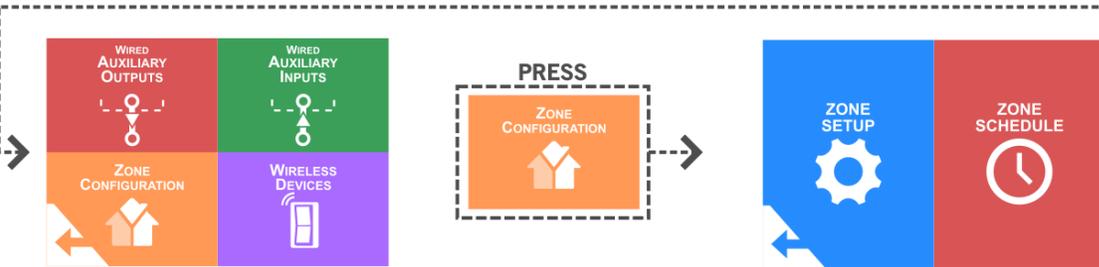
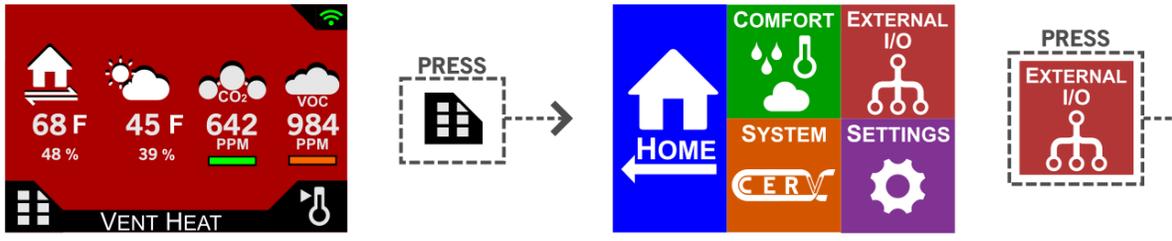
Zone Scheduling Examples

Zone damper scheduling may be used in scenarios where multiple discrete areas share a single CERV (in this example, a duplex). In this scenario, it is desired for the CERV to manage the indoor air quality of the two Zones while keeping the two completely separate (no recirculation between the two). The diagram below represents the layout of these two separate zones. Each zone has two zone dampers, one on the supply, and one on the return. Each supply/return damper pair may be electrically wired together, as to open and close together.

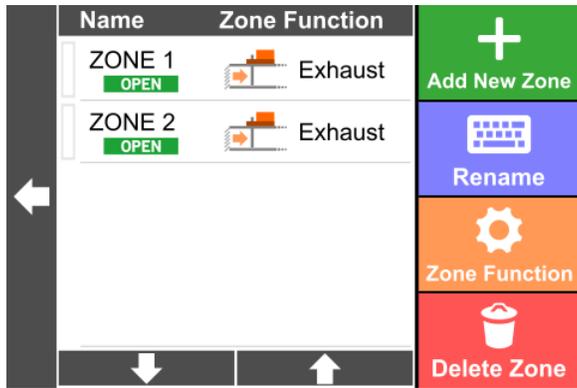


For the first step, the two Zones must be defined. Follow the path below to reach the Zone Setup screen.

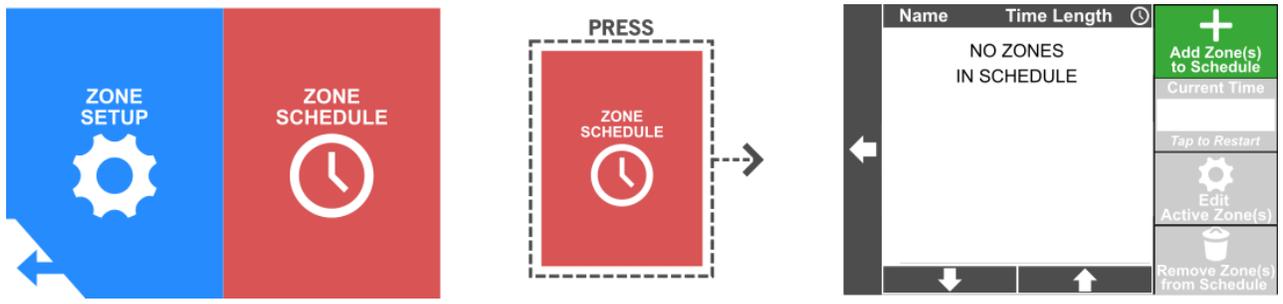
Zone Setup



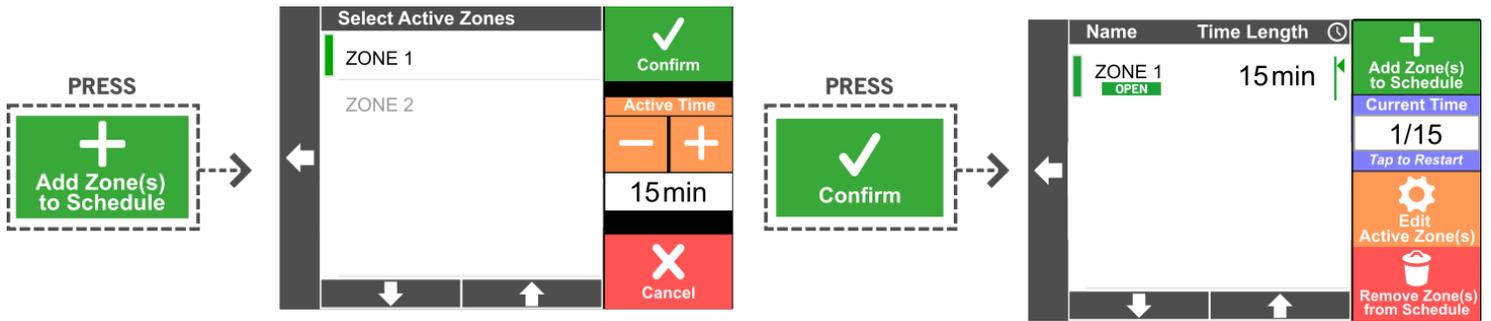
Next, add two new exhaust zones, by pressing the “Add New Zone” button.



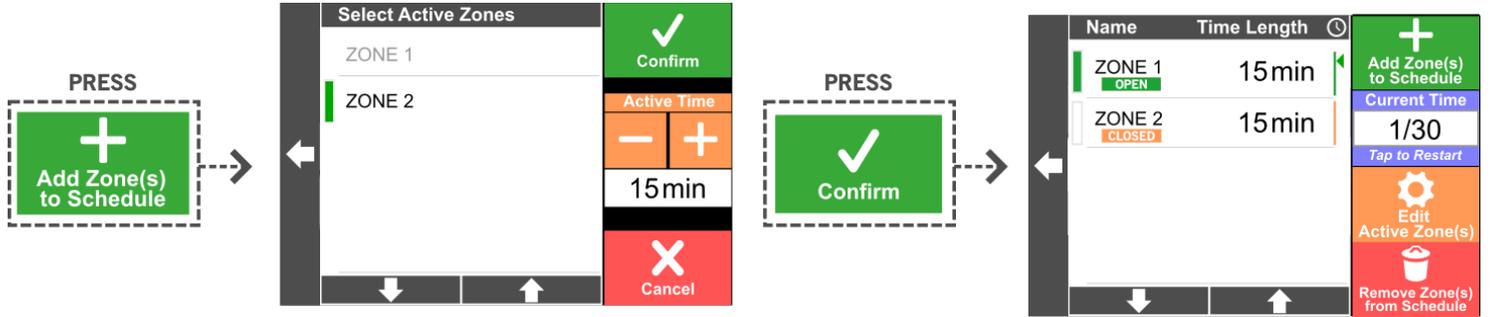
Now that the two distinct zones are defined, we will create a zone schedule. Press the Back arrow, and then select “Zone Schedule”, as seen below.



In this example, we would like to cycle between the two zones on a 15-minute interval. Press the “Add Zone(s) to Schedule” button



Select *only* the Zone 1 entry, and then press Confirm. For a more complex configuration, it would be possible to group multiple zones into a single block of scheduled time, but in this example we will keep it simple. Again, press the “Add Zone(s) to Schedule” to add the second zone to the schedule.



Lastly, the Wired Auxiliary Output channels of the CERV must be configured to these two zones, to match as seen below.

Wired Auxiliary Outputs Screen

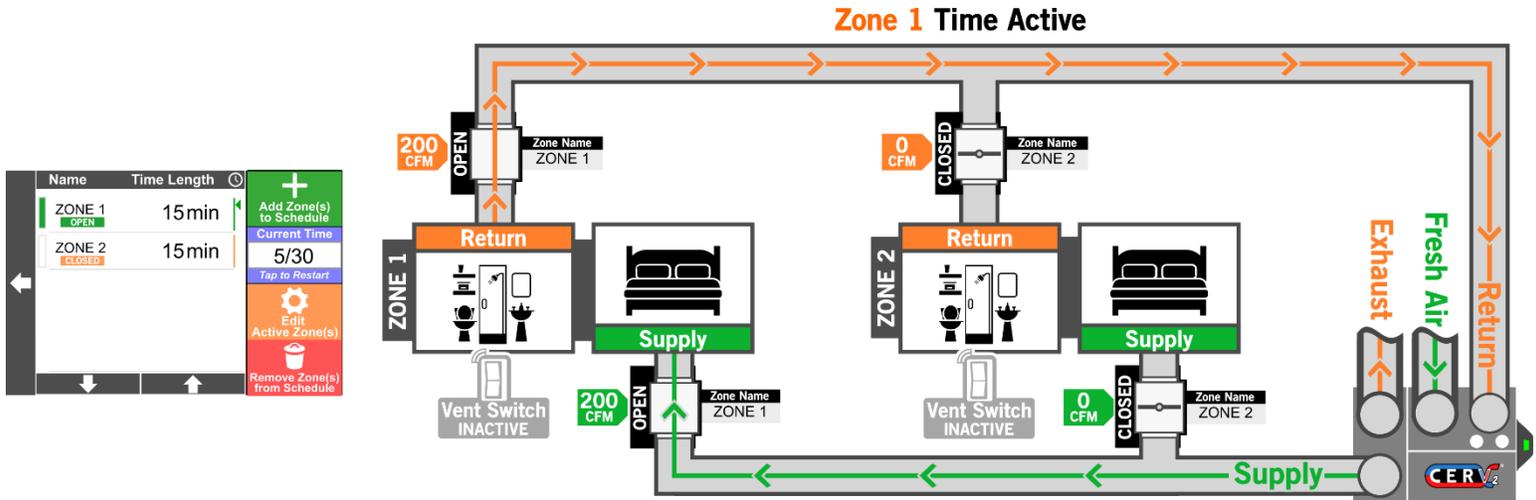


Operation

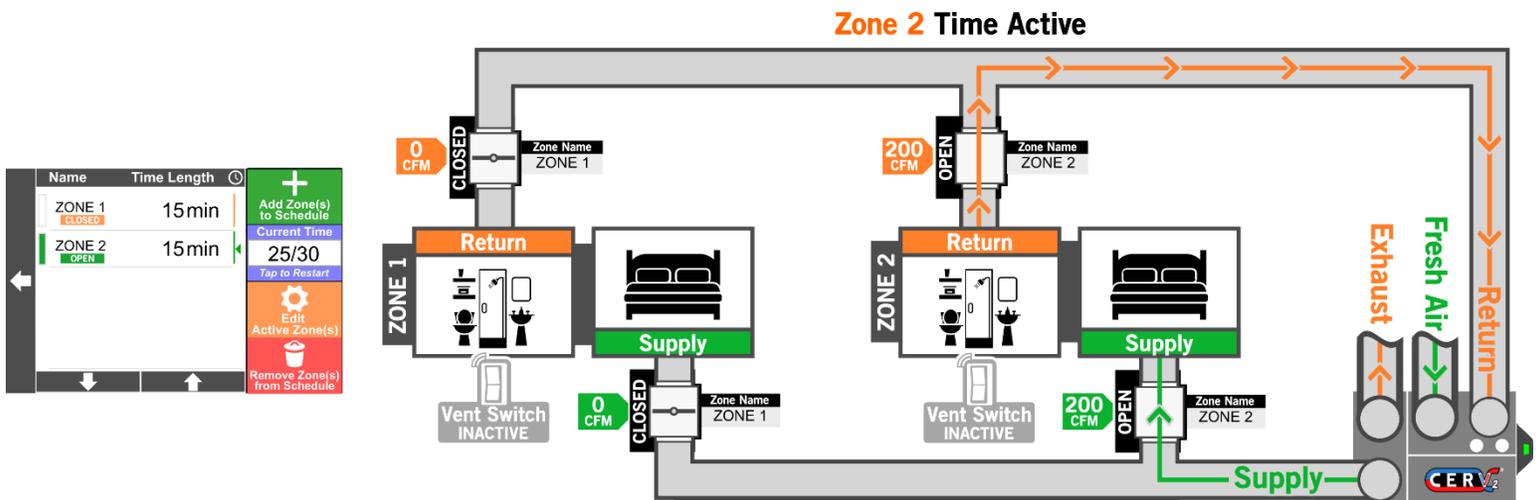
Now that the configuration is complete, let's see how this configuration will operate

Zone Schedule Times

In this zone schedule, Zone 1 and Zone 2 are both configured to have 15 minutes of operation time. This means that for the first 15 minutes (out of the 30 minute overall period), the CERV will spend its time managing the first Zone. The CERV will operate as normal in this zone. If pollutants rise above the pollutant setpoint, the CERV will ventilate to bring them back down. If the temperature goes above or below the heating and cooling setpoints, the CERV will heat or cool. During this period, Zone 2 is completely sealed off by the Zone 2 dampers.



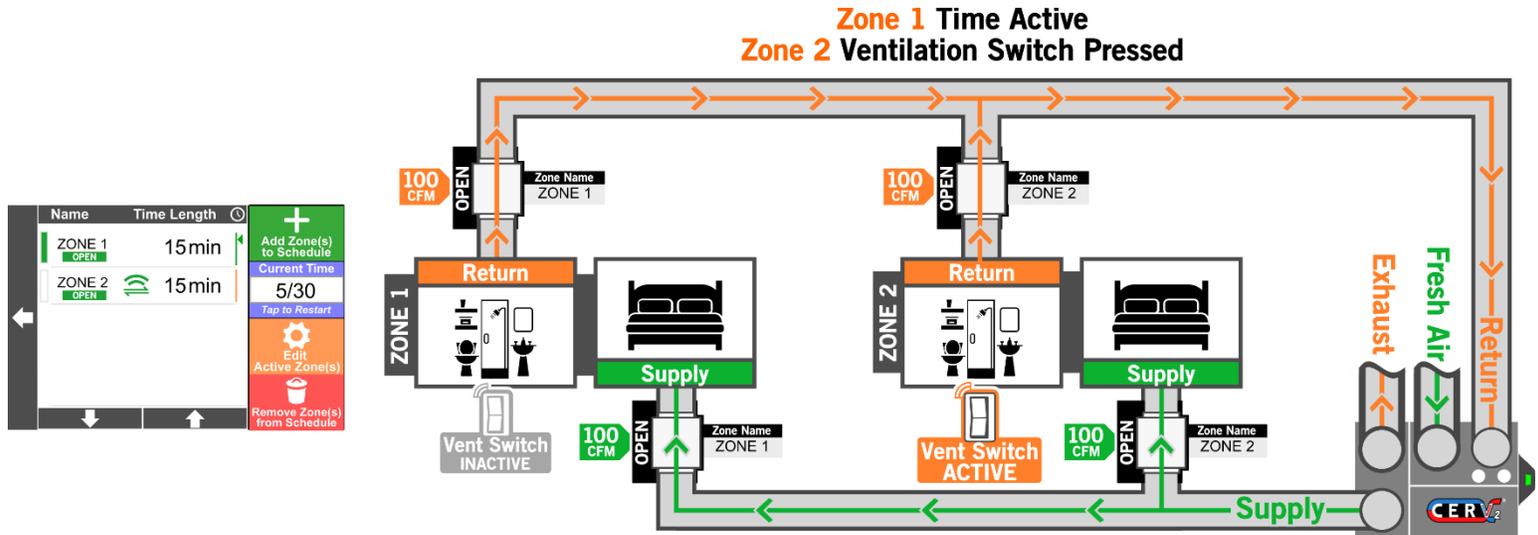
After the first 15 minutes have passed, it will be time for Zone 2. Zone 1's dampers will shut, and the CERV will operate in Zone 2 as it did in the first zone. After the 30 minute total period is complete, it will return to Zone 1 again and start the cycle over.



Operation Special Cases – Ventilation Switch

It is important for the CERV to be reactive to the needs of both Zones, therefore there are some special cases of operation where the CERV may operate in both zones at once. In these cases, the CERV will **NEVER** recirculate air between the two zones, but it will ventilate both at the same time.

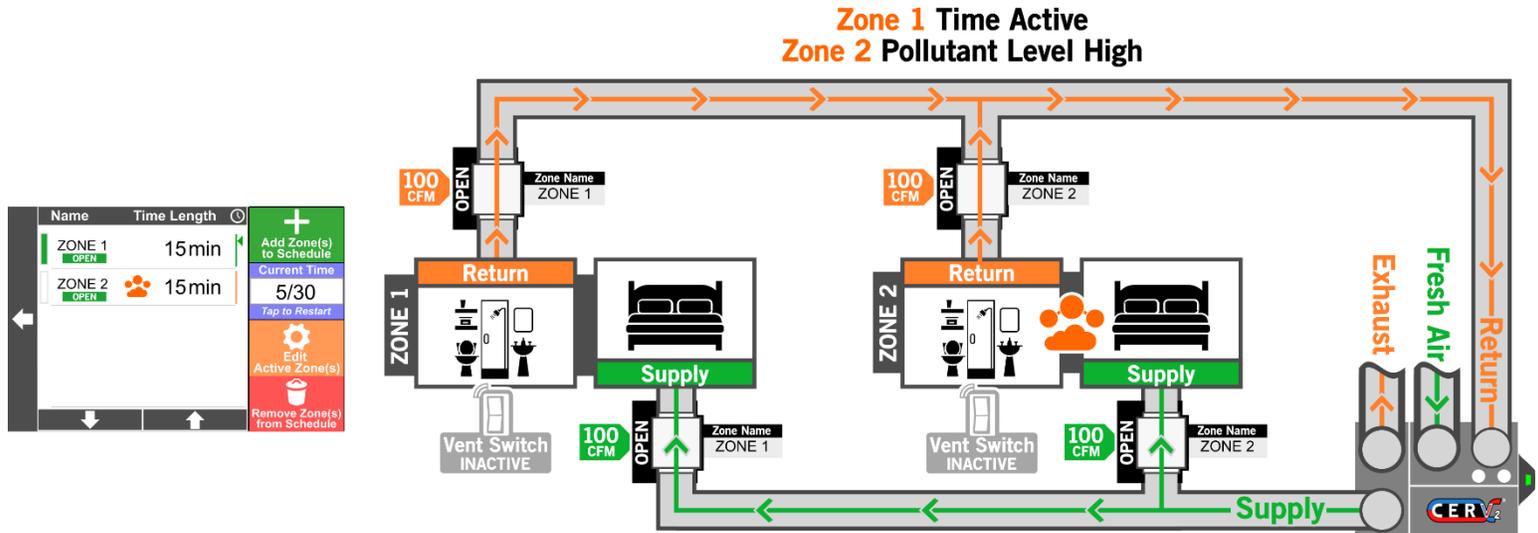
For the first example, the CERV is 5 minutes into the first zone's time, but an occupant of Zone 2 triggers the CERV to ventilate with a Wireless Ventilation Switch.



When the Wireless Ventilation Switch is triggered, both sets of zone dampers will open, and the CERV will ventilate both zones at the same time, regardless of what was happening in Zone 1. The Zone Schedule screen on the CERV will indicate this activity with the Wireless Ventilation Switch icon next to the zone with the active switch.

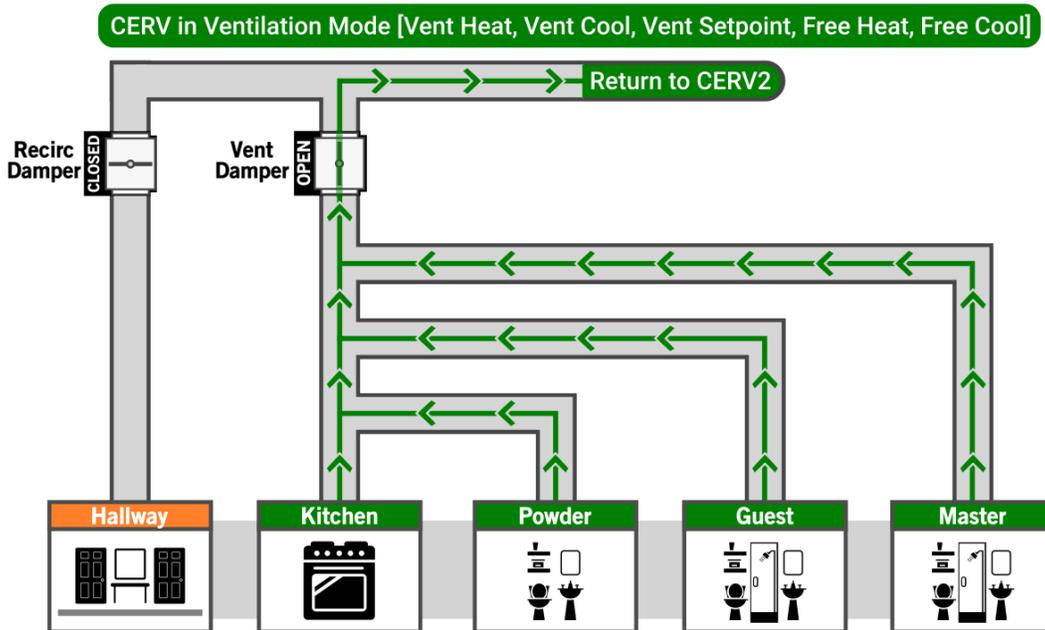
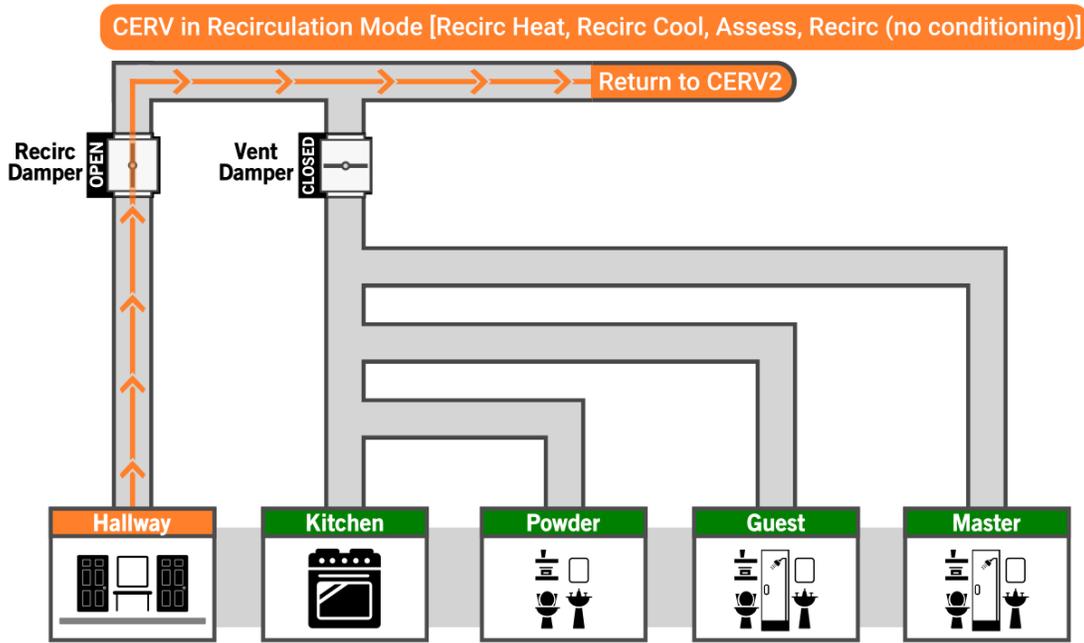
Operation Special Cases – High Pollutants in Zone

If a zone has high pollutants, the CERV will make sure it still works to improve the air quality, while also giving proper attention to the other zone. In this scenario, the CERV has been cycling through Zone 1 and Zone 2. During Zone 2's period, high CO2 or VOC levels trigger the CERV into ventilation mode. After Zone 2's period has completed, it would normally close Zone 2 and return to Zone 1, but because the pollutant levels remain high, the CERV will continue to ventilate Zone 2 and ALSO ventilate Zone 1. This ensures that Zone 1 is not ignored. Once the indoor air quality in BOTH zones is back below the indoor air quality setpoint, the CERV will return to its regularly scheduled programming.

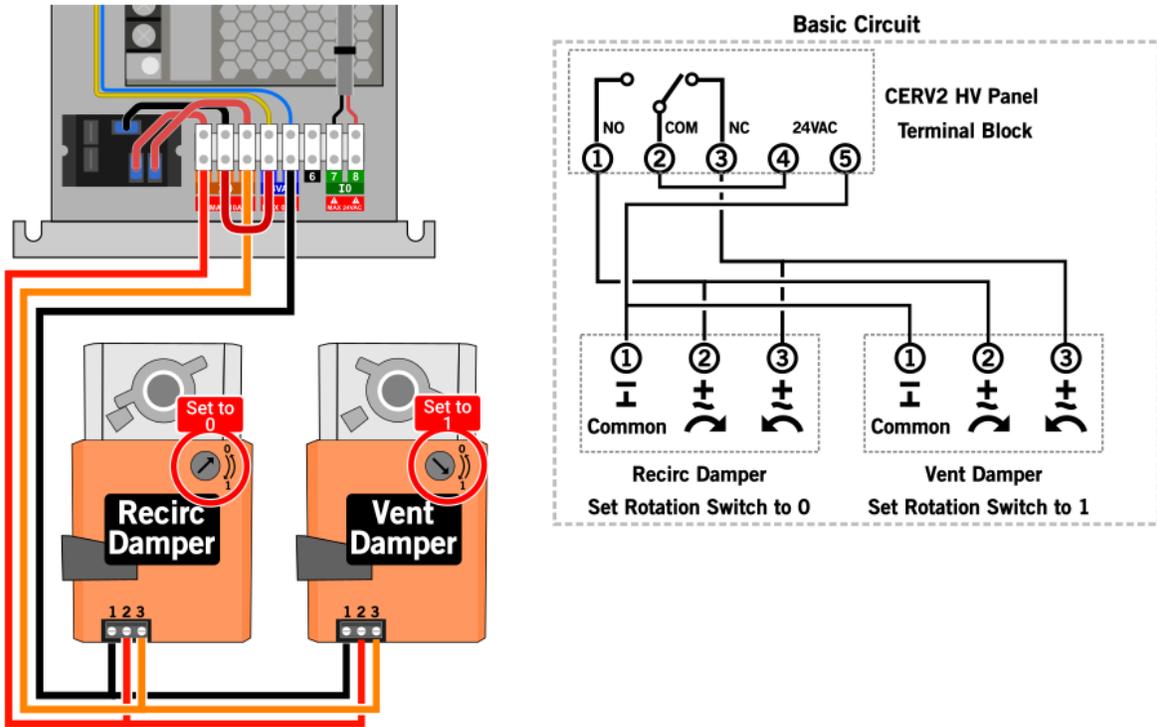


Special Case: Ventilation Only Zone (No Recirculation)

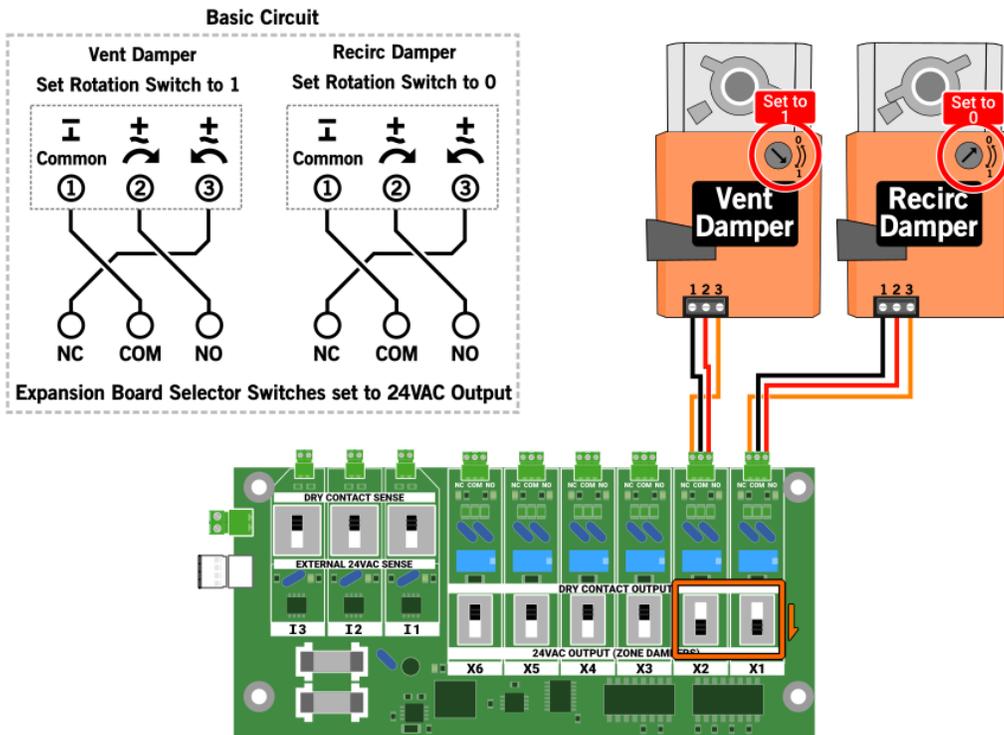
Scenario: When the CERV is recirculating, the homeowner would like air to be removed from a hallway rather than the bathrooms and kitchen. This may easily be accomplished with two zone dampers controlled using the Vent Interlock output function. The graphics below detail the operation during both Recirculation and Ventilation modes. Bathroom/kitchen exhaust dampers can also be added for individual exhaust ventilation control.



Electrical wiring for this case is straightforward. The graphic below shows using the CERV's internal X0 output configured as the **Vent Interlock** function.

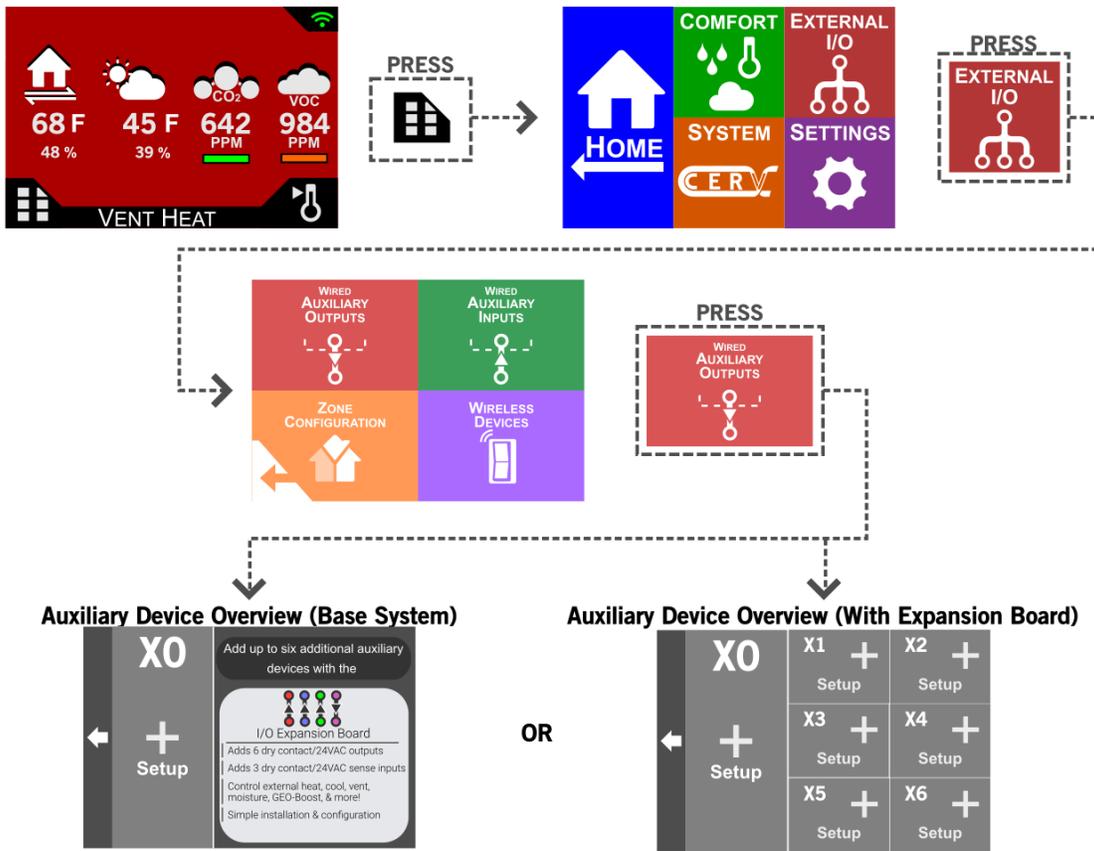


This may additionally be accomplished using two channels of the I/O Expansion Board, as shown below. Note the damper motor rotation direction switch positions as well as the I/O Expansion Board Selector Switches.

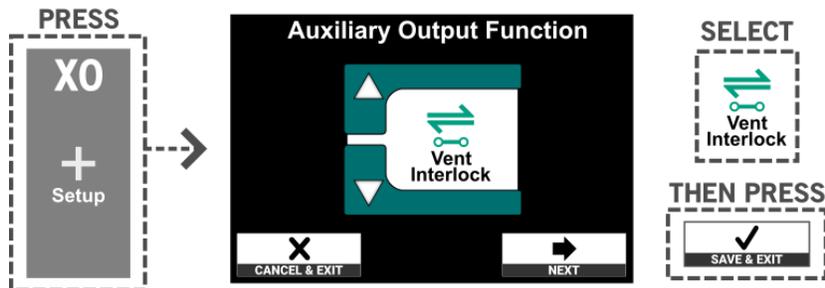


The graphic below shows the path taken on the touchscreen controller to set the output(s) as Vent Interlock.

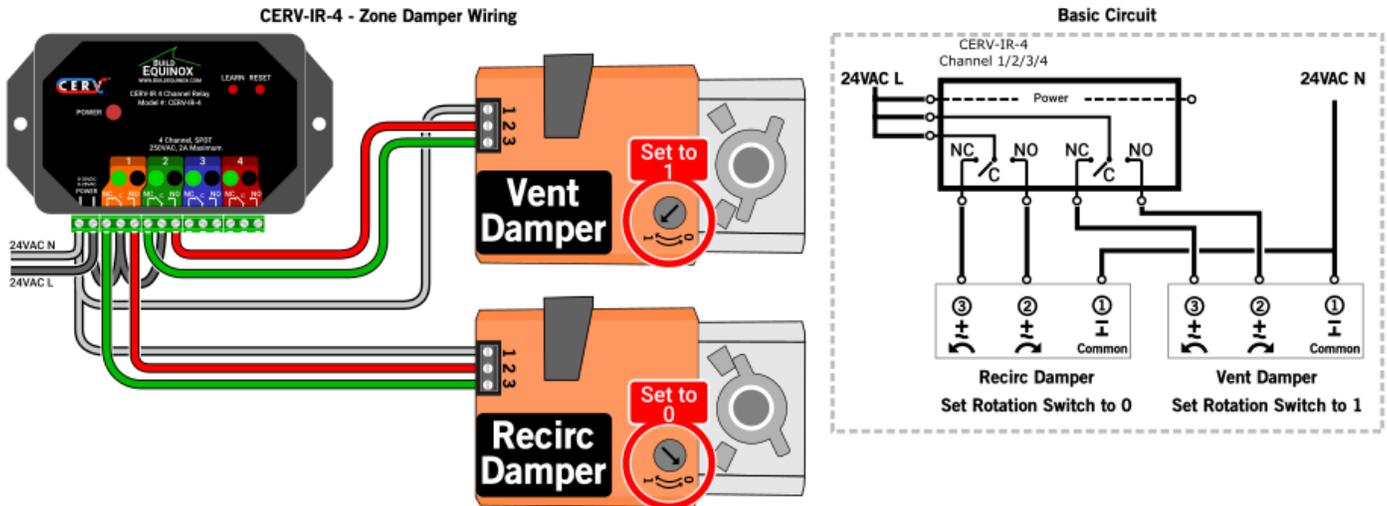
Wired Auxiliary Output Setup



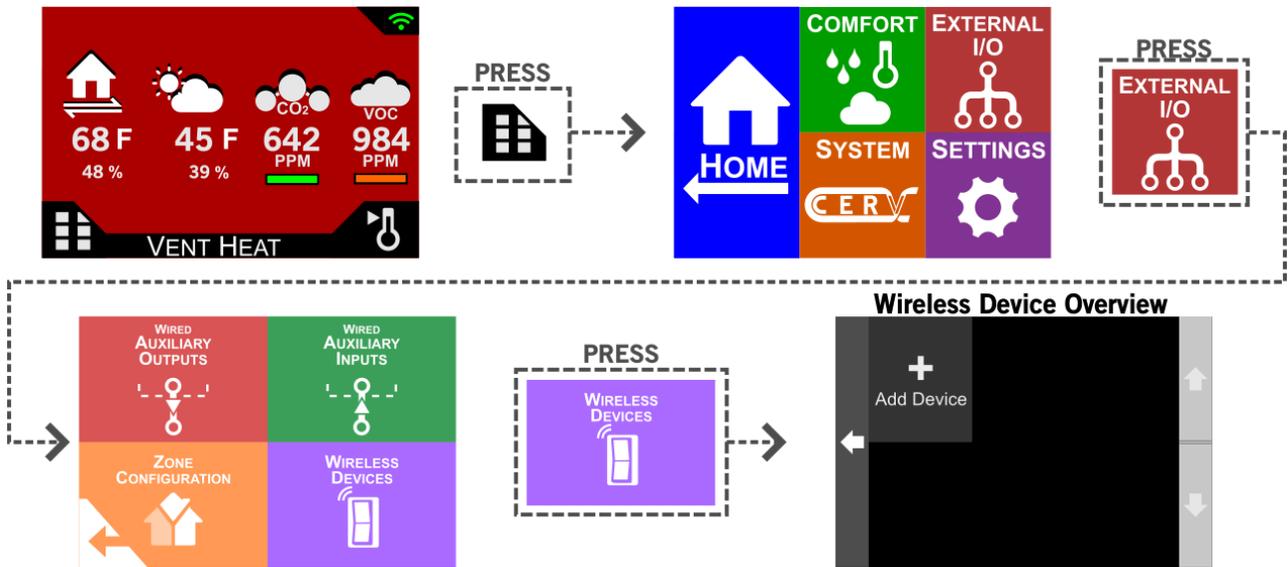
Configure Auxiliary Output



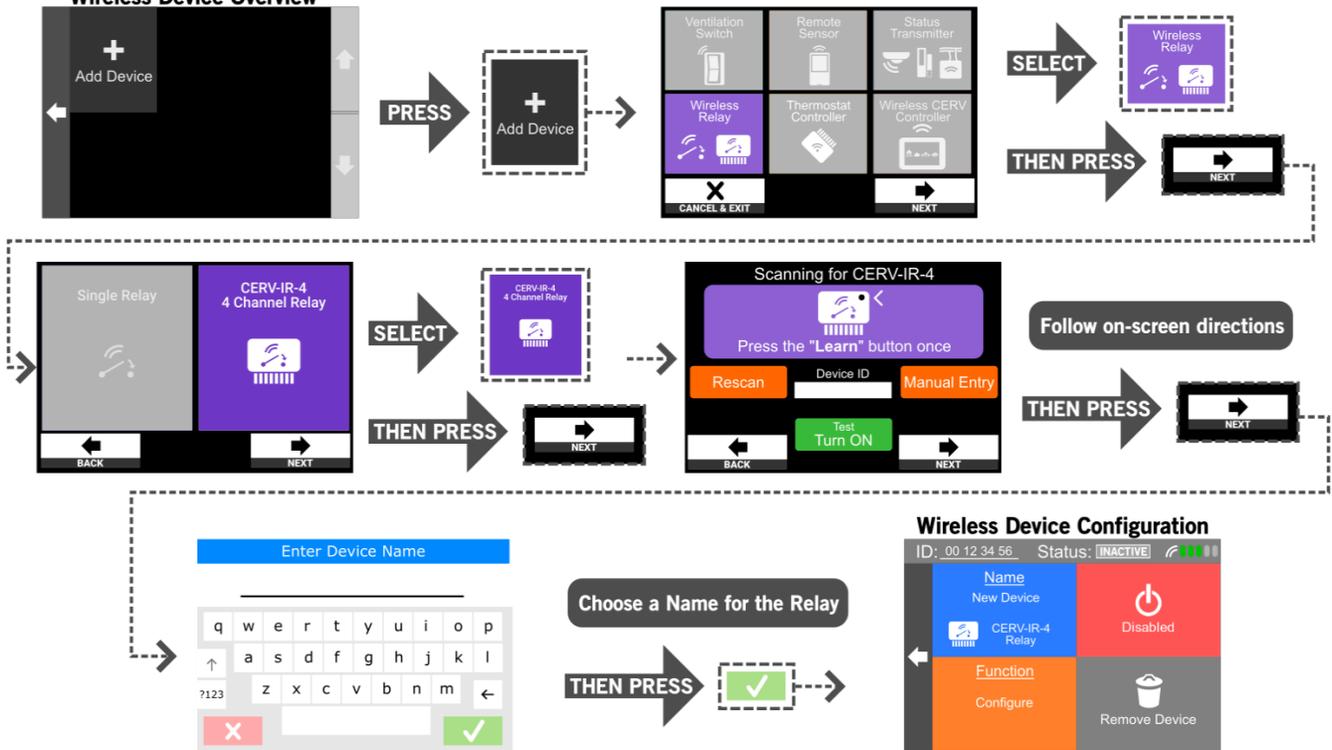
The CERV-IR-4 may also be used for this functionality. The below graphic shows the wiring and configuration.



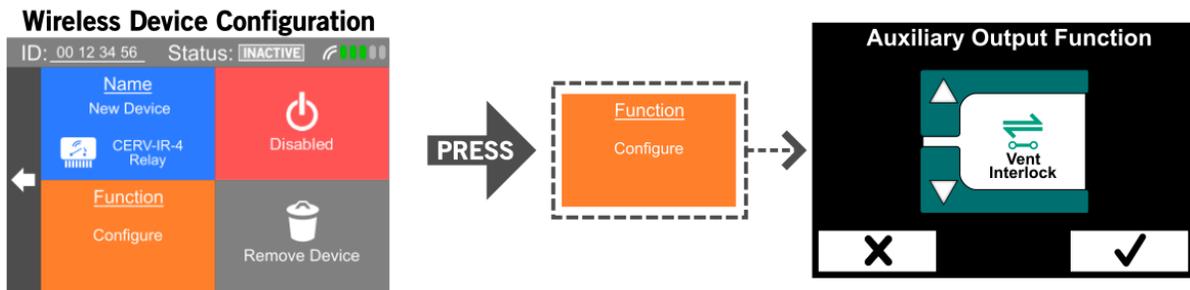
Wireless Device Setup



Wireless Device Overview

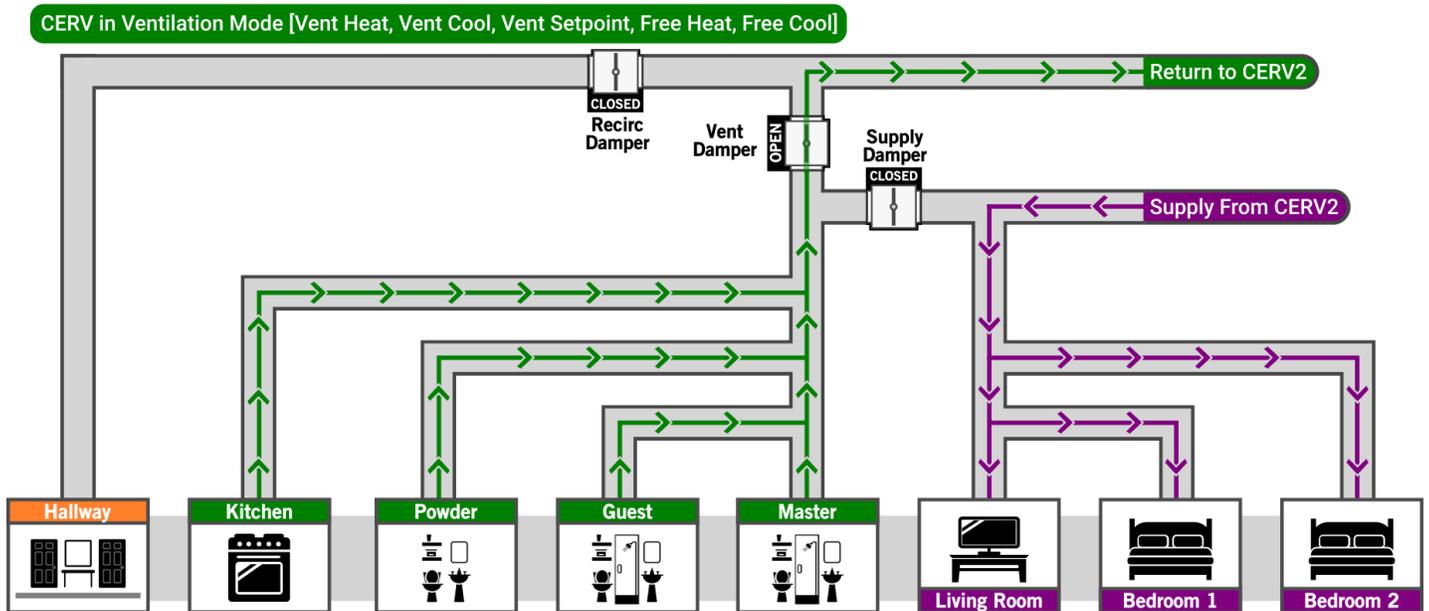
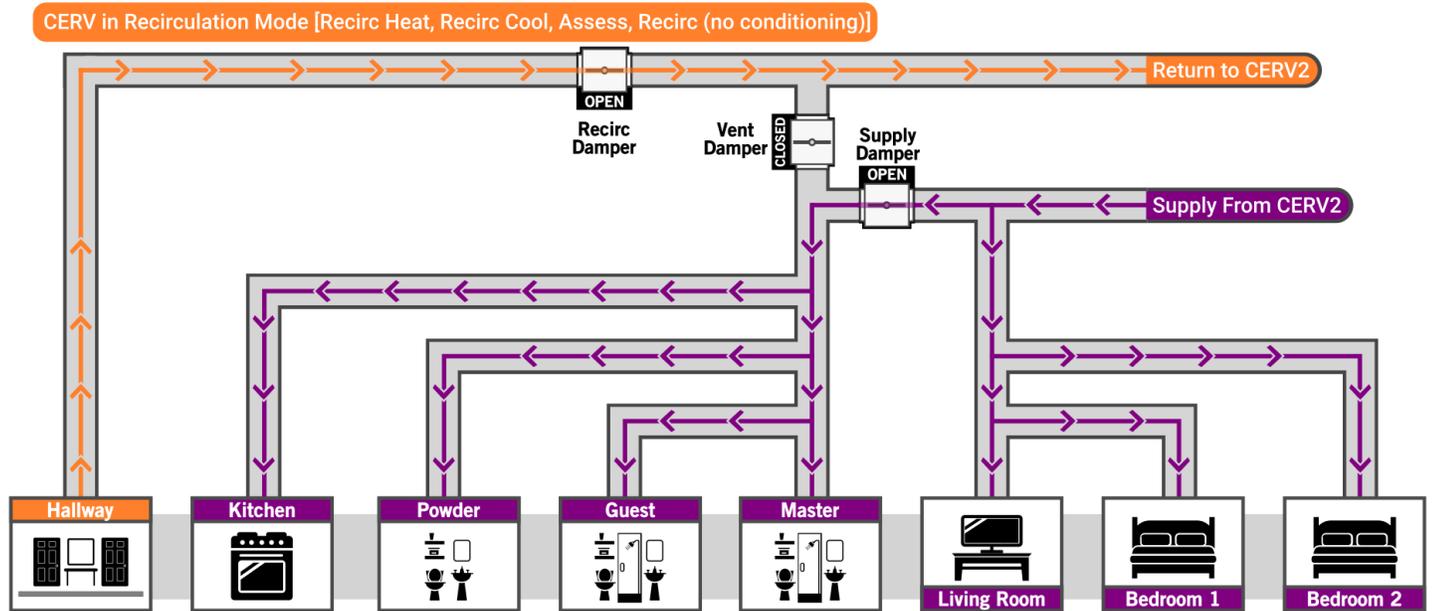


Configure CERV-IR-4 Channels

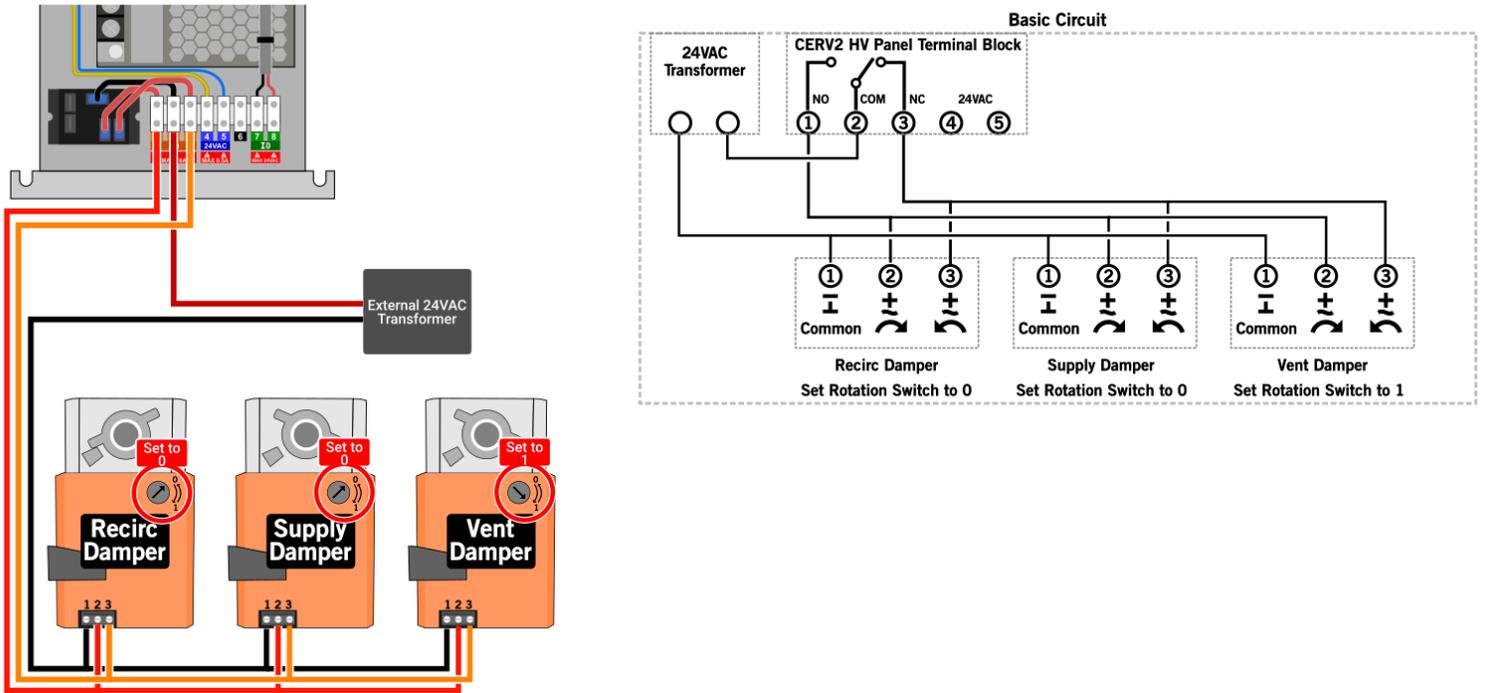


Special Case: Supply during Recirculation, Exhaust during Ventilation

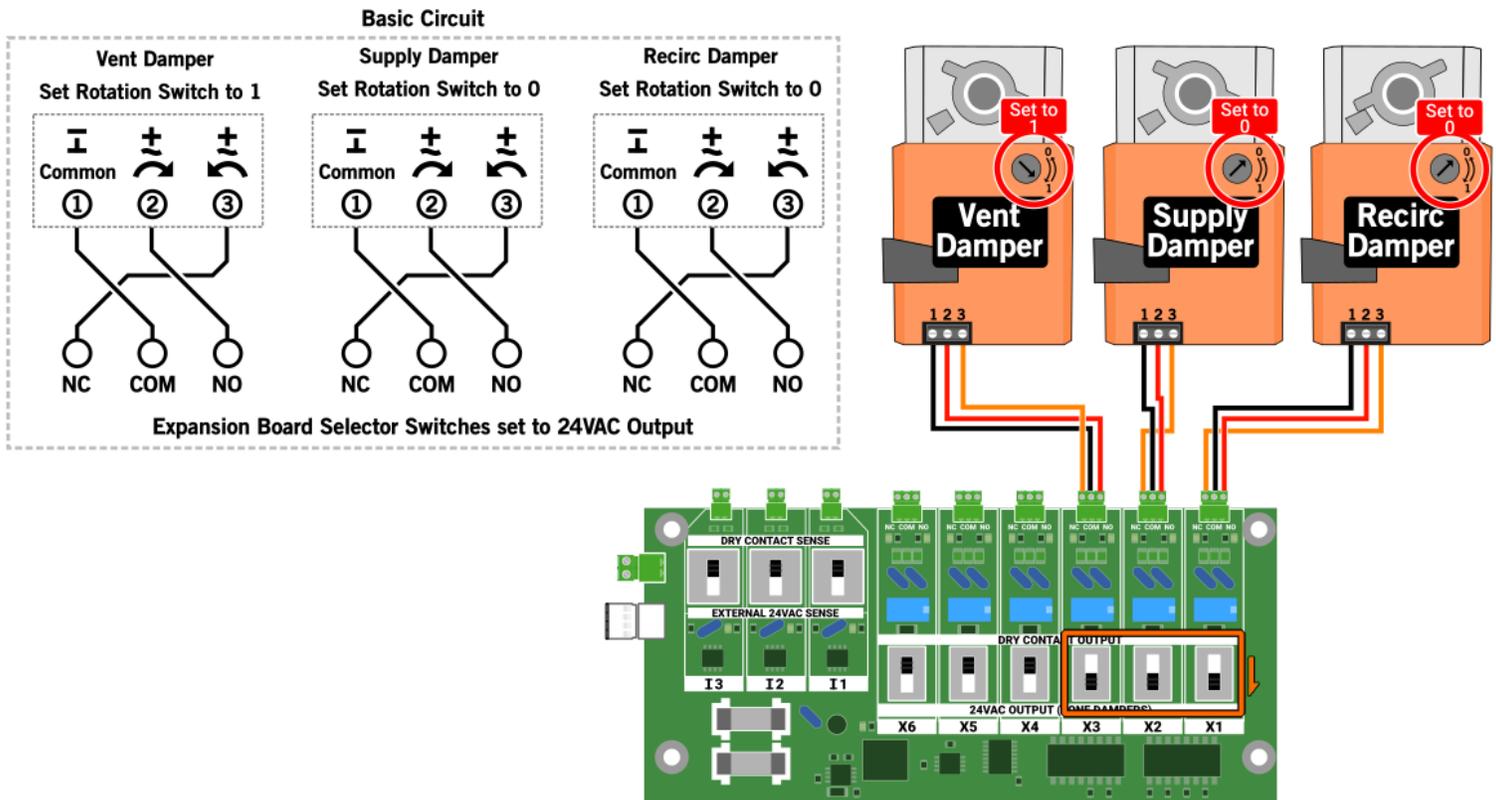
Another configuration of the previous ventilation only special case turns the bathroom/kitchen registers into supplies during recirculation instead of closing them off. This is accomplished by adding an additional zone damper between the CERV's supply duct and the return duct going to the bathroom/kitchen areas. As in the previous case return air comes from the hallway during recirculation and from the bathrooms/kitchen during ventilation.



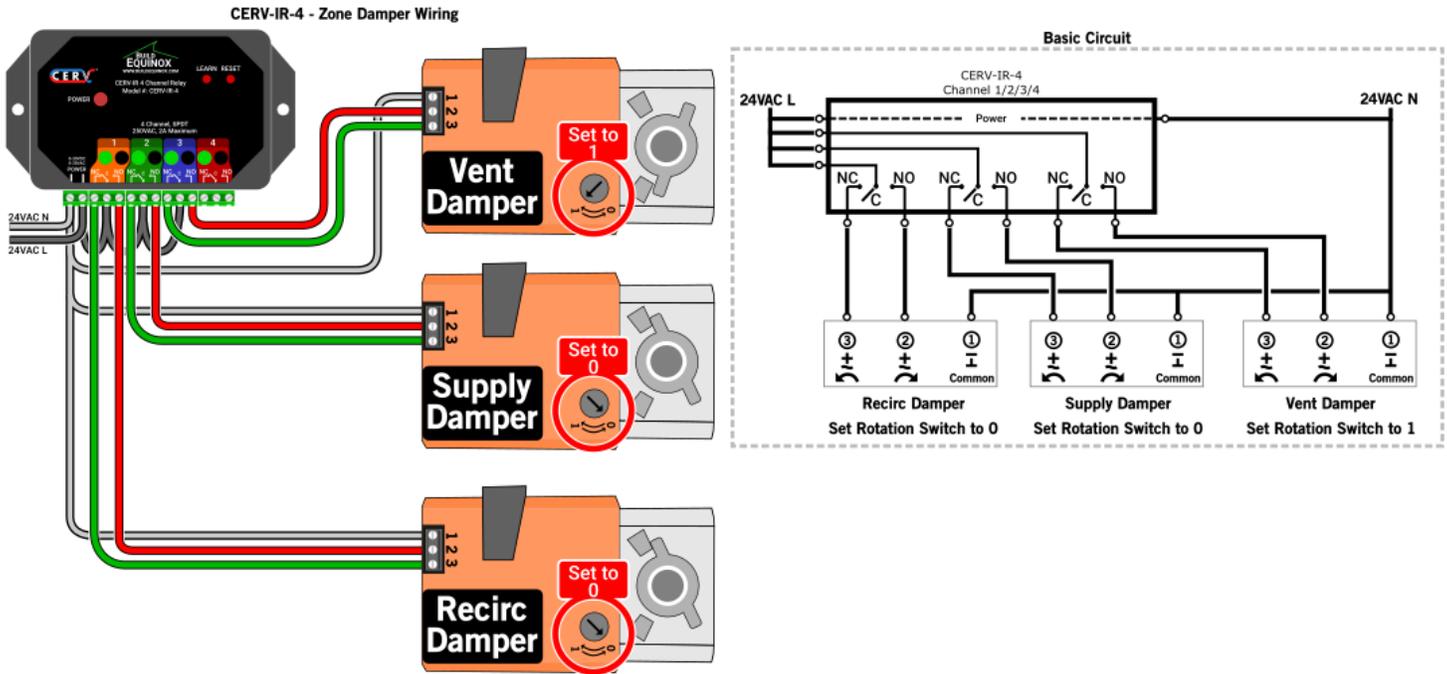
Below are diagrams for the electrical connections to the damper motors. The first graphic depicts using the CERV's internal X0 output set to **Vent Interlock** mode. NOTE: in the previous example, the CERV's internal 24VAC power supply was used to power the damper motors. For a case with 3 or more damper motors, an **external 24VAC transformer must be used**.



The I/O Expansion Board should be wired and configured as shown below. Note all switch positions.



A CERV-IR-4 may be used to control the zone dampers as well. Note the damper switch positions.



Configuration Screen guides for these outputs may be found in the previous section.